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The Influence of Analyst and Management Forecasts on Investor Decision Making: An Experimental Approach

by

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Abstract:

Analyst and management forecasts signal a firm's future prospects, and research suggests that investors are conscious of the differing incentives to release news. We examine investor reaction to the information contained in these forecasts by considering whether decisions about their shareholdings are influenced by expectations about the motives of analysts and management. Using an experiment that manipulated the type of news released and investors' stock position, we found that unfavourable forecasts had a greater effect than favourable forecasts. Investors also place more emphasis on the news released by analysts, suggesting that information from an independent source appears to be more persuasive.

Keywords:

ANALYST FORECASTS; MANAGEMENT FORECASTS; INVESTOR DECISION MAKING.

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1. Introduction

Analyst and management forecasts are two sources of publicly-available information that signal a firm's future prospects and play a part in reducing the information asymmetry that exists between investors and management. Research on the information content of these forecasts suggests that investors perceive them to contain value-relevant information (Givoly & Lakonishok 1979; Penman 1980; Waymire 1984). However, other research suggests that investors have expectations about the underlying incentives for analysts and management to issue reports or release information (Ajinkya & Gift 1984; Francis & Philbrick 1993; Nagar, Nanda & Wysocki 2003). Hence, although analyst and management forecasts should be substitutes or complementary sources of information, the weighting placed on these forecasts may lie in investors' perceptions of the differing motives of the information providers. More recently, the interrelationship between disclosures provided by management and analysts has received considerable attention where the latter have been labelled as accomplices in management's earnings guidance in situations where they have been manipulated by management in their effort to improve perceived performance (Mittendorf & Zhang 2005).

Our study uses attribution theory to explore whether investors' interpretations of the news contained in analyst and management forecasts are influenced by their expectations about the underlying motives of the provider of the information. The central theme of attribution theory is that individuals 'interpret behaviour in terms of its causes and that these interpretations play an important role in determining reactions to the behaviour' (Kelley & Michaela 1980, p. 458). We draw on this framework to explain our prediction that news that is contrary to investors' expectations will have a greater influence on their decisions.

To test our hypotheses, we conduct an experiment that manipulates the type of news released by the information provider (i.e. favourable or unfavourable forecasts in the case of analysts, and good or bad news in the case of management). This allows us to examine the effect of the news releases on investors' decisions. We elicit two measures. The first captures the decision to hold or sell all shares owned, while the second quantifies the certainty of the decision, that is, an investor's confidence in the decision made. Although the actual choice of action is of fundamental importance in the capital market, the use of this two-step response scale provides additional insight into investors' perceptions of the effect of the different types of news released by the information providers. Overconfident investors have been found to trade more often and hold undiversified portfolios (Odean 1998) while buying or selling more shares as they grow in confidence (Bloomfield, Libby & Nelson 1996). Various proxies for confidence in investor decision making have been used, for example, frequency of trading (Kyle & Wang 1997) and trade size. Our measure of confidence differs from previous proxies because it requires the individual investor to assess their confidence in the decision taken rather than demonstrate that confidence via frequency of trading or differences in parcel size traded. In other words, while the decision to hold onto or sell the stock cannot be changed, the investor is forced to deliberate on the 'correctness' of the decision. As the subjects are non-professional investors known to be prone to overconfidence, we attribute the confidence in the decision made to the credibility of the source of the information provided.

This study contributes to our understanding of how investors react to analyst and management forecasts. Lipe (1998) highlighted the need to understand how individual investors make investment decisions, and others (Hirst, Koonce & Simko 1995; Hirst, Koonce & Miller 1999) recommended the use of a 'micro' (or individual-level) approach for this endeavour. With a few exceptions, studies on analyst and management forecasts have used archival-empirical data and captured aggregate market responses thus only providing limited scope to understand individual investors' reactions. By adopting an experimental approach in our study, we are able to include and manipulate variables that would otherwise be difficult to observe, or would not be available from archival data. This enables us to gain an enhanced understanding of how an individual investor uses information contained in analyst and management forecasts. For example, in the capital market, we only observe the buy or sell decision but not how confident an investor feels about the decision, although confidence can be inferred from the offer price and the number of shares in the order placed. This behavioural accounting approach to explain anomalies in the capital market draws on theories from psychology to understand the actions of individuals. This experimental study enables us to ascertain investors' actions as well as their assessment of confidence in their actions. Confidence in one's investment decision making is important because, as shown by Griffin & Tversky (1992), less-informed investors potentially suffer from overconfidence resulting in overaggressive trading. Such trading behaviour also leads to welfare transfers to more-informed investors (Bloomfield, Libby & Nelson 1999).

Our study also contributes to the existing literature. The effect of favourable and unfavourable news on individual investors' decisions was considered by Hirst, Koonce & Simko (1995), Cote (2000) and Krishnan & Booker (2002), but these studies examined this issue solely in the context of analyst forecasts. To our knowledge, no study to date has considered the impact of news released by *both* analysts and management on individual investors' decisions. By examining these forecasts together, we can separately assess the effect of different types of news released by analysts and management. There is increasing scepticism in management's incentives in earnings guidance (Aboody & Kasznik 2000; Rogers & Stocken 2005), analysts' motivations in attempts to herd and group dynamics (Welch 2000), and analysts' motives because of concerns over career (Hong, Kubrik & Solomon 2000) and trading commission incentives (Hayes 1998). Therefore, the perceptions of investors on the credibility of the information provided and their effect on decision making become an interesting interplay. We also extend Krishnan and Booker (2002) by considering the effect of good and bad news forecasts on the propensity of investors to exhibit the disposition effect.

Based on the responses of 67 non-professional investors, our results indicate that while investors utilise both analyst and management forecasts in their decision making, they are more strongly influenced by forecasts that contain bad news or unfavourable reports. This suggests that investors may have priors about the likely type of news that analysts and management more frequently release and attach different weights accordingly. However, bad or unfavourable news did not appear to improve the confidence investors placed in their decisions. Their confidence may not have improved due to the realisation that management play expectations earnings games. Comparing the influence of the news released by the two sources,

we find analyst forecasts are more influential on investors' decision making, suggesting that analysts are perceived to be a comparatively more impartial source with less opportunity to directly manipulate information or time its release opportunistically.

The remainder of the study is structured as follows. In the next section, we provide the background and hypotheses for this study, followed by a description of the experimental design. We then provide the results and conclude with a summary of the findings, limitations and suggestions for future research.

2. Previous Literature and Hypotheses

2.1 Disposition Effect

The disposition effect evolving from prospect theory (Kahneman & Tversky 1979) has been widely examined. Shefrin & Statman (1985, p. 65) found evidence that 'investors tend to sell winners too early and ride losers too long', arguing that they keep a separate mental account for each stock, and within that account, a utility function was applied which valued outcomes in terms of gains and losses. These investors experienced a greater disutility from a loss than an equal-sized gain. Ferris, Haugen & Makhija (1988) detected the disposition effect, reporting that there was a positive correlation between price changes and trading volume. They suggested that buyers exhibited the disposition effect by selling winning stocks and holding onto losing stocks. Odean's (1998) results revealed that investors held losers longer (median 124 days) compared to winners (104 days). They realised about 24% of their gains by selling, but only 15% of their losses.

Weber & Camerer (1998) also found evidence of the disposition effect in experimental markets by pooling investor responses and analysing buy and sell trends of six risky assets. They argued that this was a construct of investors being risk averse with winnings, and risk seeking with losses with the purchase price as the reference point.

In a more recent study, Dhar & Zhu (2006) used investor trading records to investigate individual differences in the disposition effect. They found that a fifth of the sample exhibited behaviour contrary to the disposition effect. They attributed this to investors' information quality and ability to analytically process information. Interestingly they found that wealthier, older and professional investors exhibited less of the disposition effect. They also found that trading experience reduced the tendency for investors to commit the disposition effect.

Individual behavioural examination of methods to alleviate the disposition effect is a new direction in the literature. Krishnan & Booker (2002) observed the characteristics which influenced investor decision making when using analyst recommendations to make a short-term decision to hold or sell a stock. They found that the 'strength' of the forecasts, which was determined by the level of detail in the forecast, was a contributing factor in reducing the disposition effect. When a weak analyst forecast was provided (i.e. no supporting information was provided to support the analyst recommendation), it was found that it reduced the disposition effect for gains, but it had no impact on losses. However, when an analyst forecast was strong, it reduced the disposition effect for both gains and losses. Krishnan &

Booker found that investors had a tendency for regret aversion¹ consistent with Shefrin & Statman (1985). In this respect, investors preferred to follow the analysts' recommendations rather than to do the opposite. This was especially apparent for the strong analyst recommendations for a paper loss, which is also consistent with loss aversion theory (Odean 1998) where investors were reluctant to realise their losses. Krishnan & Booker (2002) is significant because it examines a plausible solution to reduce the disposition effect with the use of detailed analyst forecasts.

2.2 *Impact of Management Forecasts*

There is strong evidence from an extensive literature demonstrating that management forecasts have information content. Based on the theory of efficient markets, early work by Patell (1976) and Penman (1980) show that if managers possess information not already reflected in price, its release should cause an immediate price reaction. However, the informativeness of a management forecast depends on its timing, forecast horizon, forecast form, type of earnings news released and the perceived credibility of management.

Since disclosure is not without cost, a variety of motives have been proposed to explain managers' choice to voluntarily disclose their private information. These include basic agency reasons, adjusting investors' expectations about firm performance (Ajinkya & Gift 1984), reducing potential litigation costs (Skinner 1994; Johnson, Kasznik & Nelson 2001), raising external funds (Lang & Lundholm 2000), maximising compensation (Nagar, Nanda & Wysocki 2003) and signalling managerial talent (Trueman 1986). In light of these incentives for such voluntary and discretionary disclosure, a certain amount of optimistic bias is expected in these forecasts.² Evidence on such bias is mixed with Waymire (1984) and Ajinkya & Gift (1984) reporting optimism in management forecasts but McNichols (1989) and Frankel, McNichols & Wilson (1995) failing to find this effect.

Managers make both good and bad news forecasts in different forms and for various reasons. For example, Penman (1980) and Lev & Penman (1990) indicate that good news contained in point and range forecasts of annual earnings result in small share price increases. Managers are also conscious of how they are perceived by investors and analysts and the effect of forecasts on their reputation.³ When management establishes a pattern of credible disclosure, not only are their personal reputations enhanced but the firms they manage are associated with lower information risk and therefore, lower cost of capital (Botosan 1997; Easley & O'Hara 2004). The existing literature also indicates that companies that meet or beat the market's earnings expectations are rewarded by higher valuation figures (Kasznik & McNichols 2002; Richardson, Teoh & Wysocki 2004). In view of this, investors are mindful that managers are rewarded for a firm's higher share price through share-based compensation, bonuses and performance evaluations based on firm value. However, when earnings fall short of expectations, they punish

1. Regret aversion refers to investors wanting to make a decision to avoid regret ex-post.

2. Management also have incentives to release bad news if the firm's share price is already decreasing with the view of disclosing all bad news at once rather than let the news leak out slowly over time. This type of disclosure is known as a profit or earnings warning.

3. For example, Rogers and Stocken (2005) found evidence to suggest that management's willingness to release biased forecasts tends to be dependent on the difficulty for investors to detect the bias.

management with large negative price revisions which could result in reduced compensation or job security and even potential lawsuits. Therefore it is obvious that managers have few incentives to decrease their firm's share price.⁴

Managers also voluntarily release bad news to circumvent negative earnings announcement surprises (Soffer, Thiagarajan & Walther 2000), to avoid claims of undisclosed information and also to deflect blame for the firm's poor performance from them by offering explanations for the underperformance on external factors beyond their control. Baginski, Hassell & Hillison (2000) and Baginski, Hassell & Kimbrough (2004) report that managers were more likely to attribute bad news forecasts to external factors while Hutton, Miller & Skinner (2003) found that unlike bad news forecasts which were always informative, good news forecasts were only informative when accompanied by verifiable forward looking statements. More recently, Barton & Mercer (2005) showed that if analysts find management's explanation for poor performance improbable, such disclosures can have negative effects in the form of lower earnings forecasts and higher cost of capital.

To develop our expectations about investors' reactions to the information contained in management forecasts, we draw on attribution theory. This theory describes how individuals make causal explanations. It deals with 'the information they use in making causal inferences, and with what they do with this information to answer causal questions' (Kelley 1973, p. 107). According to attribution theory, individuals find messages that are inconsistent with the source's incentives to be more convincing than those that are consistent. Specifically, individuals are more likely to attribute the incentive-inconsistent message with the source's true beliefs such that these messages are more persuasive than incentive-consistent ones (Eagly, Wood & Chaiken 1978).

Using this theory, we expect investors to evaluate the reasons for managers making good or bad news forecasts. Weiner (1985) showed that individuals were more likely to consider why an event occurred when it was negative or unexpected since these events activate more attributional processing.

Mercer (2005) investigated how management's disclosure decisions affected their credibility with investors and found that different factors affected short-term and long-term credibility. She found disclosure of negative news to have more effect on short-term management credibility than positive news though, in the long-term, managers with positive news are viewed as more credible. Applying Mercer's interpretation of short term credibility consequences, when a bad news forecast is received, we expect investors to attribute the voluntary release of negative information to management's credibility since it is in conflict with their self-interested behaviour of increasing share price. Therefore, investors will associate these forecasts with management credibility and award it more consideration when making decisions.

Such a response to bad news forecasts is consistent with Eagley & Chaiken (1975) where they examined an individual's causal analysis in terms of his or her expectancies about the information provided by the communicator in a certain

4. Kasznik (1999) found that when forecasting bad news, managers do not manage earnings downwards while Skinner (1994) and Soffer, Thiagarajan and Walther (2000) found that compared to good news forecasts, bad news forecasts tended to be qualitative, made of shorter horizons and resulted in larger price effects.

message. If the information is unexpected, the individual disregards the communicator's characteristics and pressures in the situation and considers the information released as being a fairly truthful representation of an external reality. When a bad news management forecast is made and investors are not expecting such information, they are likely to discount management's self-interested incentives to reveal such information and perceive the information to be a true representation of the firm's position. Therefore bad news forecasts are expected to be more persuasive to investors when making decisions in situations of uncertainty.

Negative events, then, can be the catalyst for attributional activity (Hastie 1984) and, in general, when unexpectedness is controlled for, negative events still elicit causal activity (Fincham & O'Leary 1983). Therefore, with bad news forecasts typically being unanticipated, the forecast itself causes investors to attribute the information released to management credibility and weight the negative information more heavily in their decision to hold or sell their shares. The hypothesis is stated as:

H1: Bad news management forecasts have a greater impact on investor decisions than good news forecasts.

While it has been shown that negative events can be a catalyst for attribution activity, it may be unclear as to which effect is primarily driving the results we observe. We attempt to isolate the negativity or unexpectedness bias from causal attribution by comparing the current stock position to the information in the forecast. For example, if the current stock position is one of a paper loss, then a bad news forecast should be less unexpected or not provide as negative an indication of the firm's prospects. While this approach may not entirely eliminate the competing theory concern, it may go some distance in disentangling the effects.

The information contained in the forecast is predicted to affect the confidence that investors place on their decisions. The literature on source credibility generally suggests that the higher the credibility of the source, the greater its persuasive effectiveness (see Pornpitakpan 2004 for a review). Mercer (2005) found that there was a larger impact on managers' perceived short term credibility when they issued bad news forecasts compared to good news ones, and this credibility increased with unexpected negative news. Hutton & Stocken (2007) found investors to be more responsive to management forecasts when the firm had an established forecasting reputation while Williams (1996) reported that investors weighted forecasts more heavily when managers had been accurate in the past. Therefore source credibility, in this case management credibility, should increase with bad news forecasts, thus increasing the persuasiveness of the forecasts, and hence investors' confidence in their decisions. The above discussion leads to the following hypothesis:

H2: Bad news management forecasts increase investor confidence in decisions, compared to good news forecasts.

2.3 Impact of Analyst Forecasts

Analysts play important roles either as sources of information or financial intermediaries in capital markets. From prior studies, we know that on average,

investors react to the information in analyst forecasts (Givoly & Lakonishok 1979; Lys & Sohn 1990; Francis & Soffer 1997) because they present complex information in a format investors find useful in aiding their investment decisions.

Much research however has documented bias in analyst reports due to the incentives they face when producing these reports. For example, Lin & McNichols (1998), Michaely & Womack (1999) and Dechow, Hutton & Sloan (2000) found that to generate brokerage and investment banking business for their firms, analysts produce forecasts and recommendations that are optimistically biased. McNichols & O'Brien (1997) attribute the bias to stock coverage and drop decisions where analysts drop firms with comparatively unfavourable information from their analysis. Francis & Philbrick (1993) explain analysts' incentives in terms of maintaining and building good relations with management while O'Glove (1987) reported that when analysts' reports are pessimistic about a firm's prospects, management is less likely to provide the firm-specific information they need in their analysis. Therefore, it is not surprising that the distribution of analyst recommendations is skewed towards favourable ones (Beneish 1991; Francis & Soffer 1997).

The existing literature implies that investors should expect analysts to issue more favourable forecasts. Using an experiment to investigate investor behaviour, Hirst, Koonce & Simko (1995) found that the incentives of the analyst issuing the report and the conclusions in the report both affected investor reactions. Specifically, when they received a favourable report, investors attributed it to the analyst's affiliations while they placed more weight on the arguments within the report because of its unexpectedness when an unfavourable report was received. These results show that it is the information in analysts' reports and the characteristics of the analyst and investors themselves that influence investor decisions. In their investigation of whether the availability and content of analysts' reports reduced investors' tendency to commit the disposition effect, Krishnan & Booker (2002) reported that while availability reduced the disposition for gains only, the strength of the arguments in the report reduced the error for gains and losses. In their study of how investors learn about analyst forecasting ability, Chen, Francis & Jiang (2005) found that they weighted analysts' quarterly forecasts more than their prior belief when these forecasts were more accurate and frequent. Together these studies show that it is the information in analysts' reports and the characteristics of the analyst and investors themselves that influence investor decisions. In an empirical study, Frankel, Kothari & Weber (2002) showed that analyst reports were more informative when handing over bad news indicating the market's ability to discount the gloss in the reports intended to generate commissions and additional business.

From the above discussion, it appears that, like management, analysts are also perceived to have incentives to issue more favourable than unfavourable reports. Using similar arguments as for management forecasts, we expect investors to attribute the latter to the credibility of the source (Eagley & Chaiken 1975). This is supported by Cote (2000) who reported that investors who received an optimistic forecast perceived the credibility of analysts to be lower. Therefore, we expect investors to place greater reliance on unfavourable reports when making decisions. Similarly, investors' confidence in their decisions increases when they perceive analysts to be more credible. For example, they may question analysts' decision to

jeopardise their relations with management when issuing an unfavourable report (Francis & Philbrick 1993) and judge the unfavourable report to be a representation of the true situation. The following hypotheses are based on the discussion above.

H3: Unfavourable analyst forecasts have a greater impact on investor decisions than favourable forecasts.

H4: Unfavourable analyst forecasts increase investor confidence in decisions, compared to favourable forecasts.

Although we expect both unfavourable analyst and management forecasts to have a stronger effect on investor decisions compared to favourable forecasts, their relative impact is expected to differ. Schipper (1991) asserts that the role of analysts is one of information intermediary between the capital market and management while according to Chung & Jo (1996), they independently scrutinise disclosures made by managers. Cotter, Tuna & Wysocki (2006) provide additional evidence that analysts do not simply reproduce information given by management but instead act in an independent manner to adjust forecasts for bias as a result of management earnings guidance. Therefore given their function in the capital market, we expect investors to place more weight on analyst forecasts than management forecasts even when they both contain the same type of news.

3. Experimental Design

An experiment was developed to examine the impact of analyst and management forecasts on investor behaviour. Being mindful of the incentives management and analysts face when they release information about a firm's prospects, we investigated the impact of the information from the two different sources on investors' decisions and how this affected their confidence in the decisions made.

An experimental setting was used which allowed the manipulation of the variables of interest. In the experiment, subjects were provided with background information about a hypothetical company and earnings forecasts about its future prospects. They were then required to make a series of investment decisions based on the information provided. A 2x2x2 between-subjects design was used and the independent variables were: current stock position (manipulated as a paper gain or paper loss); management forecast (manipulated as good news or bad news); and analyst forecast (manipulated as favourable or unfavourable). While the primary interest of our study are the effects of the types of news released by analysts and management, we included the current stock position because prior studies (e.g. Shefrin & Statman 1985; Odean 1998; Shapira & Venezia 2000) reported the tendency for investors to sell shares that had appreciated in value while holding onto shares that had dropped in value. This pattern of behaviour, termed the disposition effect, can be explained by Kahneman & Tversky's (1979) prospect theory, which suggests that decision makers code gains and losses relative to some reference point, and are risk-averse for gains but risk-seeking for losses. This suboptimal investment behaviour is widely documented in the literature, and we manipulate the investor's current stock position in our study to provide a benchmark against which to examine the effects of analyst and management

forecasts on decision making. Subjects were therefore provided with paper gain or loss situations to control for such suboptimal investment behaviour. The two dependent variables were: (1) investment decision; and, (2) confidence in the decision made.

Each subject randomly received one of eight versions of the research instrument and was required to answer two questions in each of the three parts of the experiment. In the first part of the instrument, the subject was provided with background information on a paper gain or loss situation. In the next part, a management forecast was provided and subjects' responses enabled us to determine whether the information affected their decisions. In the third part of the instrument, an analyst forecast provided. These responses allowed us to assess the impact of the analyst forecast, given the management forecast, in situations where the later forecast confirmed or contradicted information in the earlier one.

Subjects were required to make a decision to either retain all their shares or alternatively, sell all their shares and then indicate how confident they felt about the decision they had just made. The first question in the experiment required subjects to commit to a definite decision to either hold or sell their shares while the second question tested their confidence in the decision made. In contrast, Krishnan & Booker (2002) measured investors' decisions on a six-point scale where 1 indicated 'Definitely Hold' and 6 indicated 'Definitely Sell'. We believe our use of two separate scales is an improved measure of investor decisions. The first scale, a dichotomous measure, is a better reflection of what investors must ultimately decide (i.e. to hold or sell their shares), regardless of how certain they are of their decision. We then measure their confidence on a separate scale to gain further insight into their judgment.

The case described a hypothetical pharmaceutical company (Aussie Pharmaceuticals Ltd.) which was listed on the Australian Stock Exchange (ASX). Subjects were asked to assume the role of an investor in this company and respond to questions about their current shareholding. In Part A of the experiment, subjects were presented with background about Aussie Pharmaceuticals and its current share price. The current price of Aussie Pharmaceuticals was manipulated to be *higher* or *lower* than the subject's original purchase price. Subjects were also informed that during the last week, the directors of Aussie Pharmaceuticals had announced the development of a new influenza vaccine which was undergoing clinical trials. The directors expected the Therapeutic Goods Administration (TGA) to release their findings by the end of the following month. Depending on TGA approval, the share price would either increase or decrease. Based on this information, subjects were required to make a decision as to whether to sell or hold the shares. They were also asked to indicate their confidence in the decision, which was recorded on a scale ranging from 0 (not sure at all) to 100 (very sure). Responses to Part A allowed us to benchmark subjects' subsequent responses to Parts B and C.

In Part B of the experiment, subjects were provided with a management forecast. Subjects assigned to the *good news* scenario were told that Aussie Pharmaceuticals' management had announced they were optimistic about the success of the clinical trials and subsequent approval by the TGA. Subjects assigned to the *bad news* scenario were informed that Aussie Pharmaceuticals' management had announced that they had some doubts about the success of the

trials because they believed that the trials were overly stringent and, in the past, management had occasionally expressed concerns about the way in which trial results were interpreted by the TGA. In light of this information, subjects were again asked to indicate if they would hold or sell their shares and to indicate the certainty they placed on their decision, which was recorded on a 100 point scale ranging from 0 (Not sure at all) to 100 (Very sure).

In Part C of the experiment, subjects received an analyst forecast. Subjects were told that following the release of the management forecasts by Aussie Pharmaceuticals, analysts released their periodic forecasts and accompanying information. Subjects were told that the consensus opinion on Aussie Pharmaceuticals was either *favourable* or *unfavourable*. After receiving this information, subjects were again asked to indicate if they would hold or sell their shares and to indicate the confidence they felt in their decision.

At the conclusion of the case, subjects were required to provide demographic information. They were also asked to indicate how frequently they relied on various information sources when making an investment decision, and to indicate their perceptions on the relative importance of management and analyst forecasts.

3.1 Subjects

Sixty seven students participated in this experiment. These students were undergraduate and MBA students who were enrolled in intermediate finance and financial accounting classes. A familiar concern in experimental studies using graduate students for investment tasks is that they differ from real life investors. However Libby, Bloomfield & Nelson (2002) propose subjects only require a basic understanding of accounting and investing in experiments of novice investor judgment. Elliott, Hodge, Kennedy & Pronk (2004) also argue that graduate business students are suitable proxies for non-professional investors as long as researchers match the experimental task to their educational and work experience levels. In our study, 60% of the undergraduate students owned shares, and 70% of this group of shareholders had up to three years' experience in personal investing. Furthermore, their tasks involved making a decision on whether to retain or sell their own shares and they were provided with sufficient information to make this decision. The confidence assessment was expected to mirror their understanding of the information provided. Given the subjects' familiarity with financial statement information and accounting and finance concepts, we believe these tasks were appropriate to their knowledge base.

Demographic information for our sample is provided in table 1. Fifty eight percent of the subjects had personal share investments with 56% of this group having up to three years' investing experience. Males accounted for 76% of the sample and half the subjects were in the 20-40 year age range. All subjects were completing or had completed an undergraduate degree and the mean rating was 3.5 (on a five point Likert-type scale where 1 indicates 'No Knowledge' and 5 'High Knowledge') on knowledge of finance concepts and principles. The mean rating shows that the subjects considered themselves having a higher than average level of knowledge in finance concepts.

Table 1
Demographic Information

	Share owners (n = 41)	Non-owners (n = 26)
Proportion of males (%)	87.2	57.7
<i>Experience in share investing (%)</i>		
Less than 1 year	5.1	
1-3 years	56.4	
4-6 years	20.5	
7-10 years	7.7	
More than 10 years	10.3	
<i>Trading frequency (%)</i>		
Daily	0	
Weekly	5.3	
Monthly	18.4	
Annually	28.9	
When necessary	47.4	
<i>Knowledge of concepts^a</i>		
Mean	3.45	3.50
(std dev)	(0.64)	(0.76)
Median	3.00	4.00
<i>Importance of information when making investment decisions (%)</i>		
Management forecasts	2.6	
Analyst forecasts	35.9	
Neither	25.6	
Both equally important	35.9	
<i>Case study realism^b</i>		
Mean	3.56	3.46
(std dev)	(0.97)	(0.90)
Median	4.00	3.50

Note: a Subjects rated their knowledge levels on a scale of 1 (No knowledge) to 5 (High knowledge).

b Subjects rated the realism of the case study on a scale of 1 (Not realistic) to 5 (Very realistic).

There was a marked difference in the importance attributed to management and analyst forecasts by shareowners. Only 2.6% found management forecasts to be important while 36% rated analyst forecasts. However, another 36% found both to be of equal importance. Of the shareowners, 47% reported that they traded 'when necessary' while 29% and 18% traded annually and monthly respectively.

4. Results

4.1 Management Forecast and Analyst Forecast on Investor Decision

In Parts B and C of the experiment, we investigated whether the information contained in analyst and management forecasts affected investor decision making. These alternative sources of information about the prospects of the company were expected to impact differently on their decisions, depending on the type of the forecast. We expect analyst and management forecasts to impact more strongly on investors' decisions when the information is negative.

Table 2, panels A and B show the effect of the management forecasts on subjects' decisions to hold or sell their shares in paper gain and loss situations and also their confidence in the decision.

Table 2
Management Forecast and Analyst Forecast on Investor Decision

Panel A: Comparison of Investors' Hold and Sell Decisions When Provided with Management Forecasts

		Management Forecasts			
		Good news (<i>n</i> = 12)		Bad news (<i>n</i> = 18)	
Paper Gain (<i>n</i> = 30)					
Hold shares	21	8		17	
Sell shares	9	4	$\chi^2 = 0.63$	1	$\chi^2 = 5.59^{**}$
Paper Loss (<i>n</i> = 37)					
Hold shares	36	8		17	
Sell shares	1	10	$\chi^2 = 0.47$	2	$\chi^2 = 0.00$

Note: * indicates statistical significance at $p < 0.10$, ** at $p < 0.05$ and *** at $p < 0.01$ for chi-square test.

Panel B: The Effect of Stock Position and Management Forecast on the Decision to Hold or Sell the Shares and the Certainty of Decisions

		Stock Position			
		Paper Gain (<i>n</i> = 12)		Paper Loss (<i>n</i> = 18)	
		Hold Shares	Sell Shares	Hold Shares	Sell Shares
Good news management forecasts					
Mean decision certainty (std dev)		78.75 (13.39)	73.75 (11.08)	69.91 (14.77)	60.00 (0.00)
		Paper Gain (<i>n</i> = 18)		Paper Loss (<i>n</i> = 19)	
Bad news management forecasts					
Mean decision certainty (std dev)		58.68 ^{**} (26.52)	69.15 (15.86)	56.70 ^{**} (23.15)	80.00 (28.28)

Note: * indicates statistical significance at $p < 0.10$, ** at $p < 0.05$ and *** at $p < 0.01$ for mean differences between good and bad news management forecasts for hold and sell decisions separately (one-tailed *t*-test).

The paper gain and loss scenarios were analysed separately as a consequence of investors' asymmetric responses to them. The effect of a management forecast on a hold/sell decision was assessed relative to the initial decision in Part A. For example, the proportion of holds to sells in a gain situation was compared to the proportion when investors received a good news management forecast and the chi-squared test was used to test the significance of the change in investor decision. Before the management forecast was provided, 30% of subjects in the paper gain scenario had decided to sell their shares while 97% of those in the paper loss situation had decided to hold onto their shares. The disposition effect is evident, particularly in the paper loss scenario where investors are holding onto their losing stock. The results in panel A also indicate that the hold/sell proportion was significantly different at $p < 0.05$ only when subjects received a forecast contradicting the stock position. Therefore, news in the management forecast has a larger impact when compared to prevailing conditions, it provides unexpected information. In the paper gain scenario, more subjects decided to hold onto their shares when the bad news forecast was released. When a good news forecast was given in the loss scenario, 44% of subjects chose to hold onto their shares compared to the 97% who before receiving any forecasts, indicated they would hold onto their shares. It appears that the provision of the management forecast worsens the disposition effect when the forecast contains bad news. In the paper gain scenario, 33% of subjects sell their shares upon receiving the good news forecast while 94% hold onto their shares when the bad news forecast is given. The disposition effect is reduced in the paper loss situation with 55% of subject selling their shares with the good news forecast. With 89% holding their shares with the bad news forecast, there appears to be no change in the disposition effect. Overall, unexpected news in the management forecast has a greater impact on investor decision and when bad news is provided, the disposition effect worsens and with good news, it is reduced. In sum though, the lack of statistical significance in change in investor decision when a management forecast is provided signals the limited use of this information in investor decision making or the lack of credibility associated with its content.

An analysis of the confidence assessments shown in panel B reveals that compared to good news forecasts, subjects were generally less certain of their decisions when they received a bad news one. Subjects in the paper gain situation who received a good news management forecast and decided to hold their shares were 78.75% certain of the decision while those with the bad news forecasts were only 58.68% certain, the difference being statistically significant at $p < 0.05$. Similarly, those that decided to sell despite the good news forecasts were 73.75% certain of the decision compared to 69.15% for those with bad news. With the paper loss, the differences in confidence was significant only for subjects who had decided to hold their shares, 69.9% for good news forecasts compared to 56.7% for bad news forecasts. Taken as a whole, these results suggest that the additional information in the management forecasts, especially in bad news forecasts reduce subjects' confidence in their hold decisions only. That is, although the subjects exhibit the disposition effect by holding onto their shares, the forecast caused them to be less certain about the decision. This is inconsistent with our hypothesis that the information in management's bad news forecasts increases confidence in the

decision made since the credibility of management forecast is expected to increase with the unexpected bad news (Mercer 2005).

Table 3
Comparison of Investors' Hold and Sell Decisions when Provided with Management Forecasts and Analyst Forecasts

Management Forecasts		Analyst Forecasts		
<i>Paper Gain</i>				
Good news ($n = 12$)		Favourable ($n = 6$)		Unfavourable ($n = 6$)
Hold shares	8	4	$\chi^2 = 0.00$	0
Sell shares	4	2		6
Bad news ($n = 18$)		Favourable ($n = 6$)		Unfavourable ($n = 12$)
Hold shares	17	5	$\chi^2 = 1.41$	1 $\chi^2 = 169.9***$
Sell shares	1	1		11
<i>Paper Loss</i>				
Good news ($n = 18$)		Favourable ($n = 7$)		Unfavourable ($n = 11$)
Hold shares	8	7		7 $\chi^2 = 1.64$
Sell shares	10	0		4
Bad news ($n = 19$)		Favourable ($n = 11$)		Unfavourable ($n = 8$)
Hold shares	17	11		4
Sell shares	2	0		4 $\chi^2 = 13.23***$

Note: Indicates statistical significance at $p < 0.10$, ** at $p < 0.05$ and *** at $p < 0.01$ for Chi-square test

In Part C of the experiment, subjects were provided with additional information in the form of an analyst forecast and the results of the analysis are provided in table 4. Favourable analyst forecasts appear to induce subjects to retain their shares while unfavourable forecasts result in selling decisions. The chi-square tests in panel A confirm that unfavourable forecasts have a stronger impact on decisions where the proportion of hold to sell was statistically different at the 0.01 level for those with the paper gain and bad news management forecast ($\chi^2 = 169.9$, $p < 0.01$) and also those with the paper loss and bad news management forecasts ($\chi^2 = 13.23$, $p < 0.01$) situations. As predicted, more weight was placed on unfavourable analyst forecasts because subjects are not expecting negative news from analysts and the news confirmed the earlier management forecasts. They may also have viewed the analyst forecast as incorporating the bad news management forecast and thus they reacted more strongly to the information. The change in proportion of hold to sell decisions can be interpreted as additional information having affected decision making. This stronger reliance on analyst forecasts is also consistent with 36% of subjects rating analyst forecasts important for investment decision making compared to only 2.6% of subjects for management forecasts.

Analyst forecasts appear to reduce investors' tendency to commit the disposition effect, consistent with Krishnan and Booker (2002). In the paper gain

situation, analyst forecasts reduce the tendency of investors to sell winning stock. For example, when the management forecast contains bad news, 94% of subjects held onto their shares but when the analyst forecast was favourable, 16% sold their shares compared to 8.3% keeping their shares when the forecast was unfavourable. In the paper loss scenario when the management forecast contained bad news, 89% of subjects decided to retain their shares and when the analyst forecast was favourable, all subjects decided to maintain their holdings. With the unfavourable forecast, only 50% decided to sell their stock. A comparison of the effect of management and analyst forecasts on the likelihood of investors exhibiting the disposition effect suggests that while the former worsens the effect, analyst forecasts appear to have a mitigating influence. This could be associated with the credibility of the external source providing the forecasts (Cotter, Tuna & Wysocki 2006).

An analysis of the confidence assessment in table 4 shows that, like management forecasts, unfavourable analyst forecasts also increased subjects' uncertainty about their decisions, consistent with Cote (2000). A comparison of mean certainty measures between favourable and unfavourable forecasts for both hold and sell decisions provides consistent results of their higher confidence in the decisions when provided with favourable news. The only statistically significant difference at $p < 0.05$ was for the paper gain/good news management forecast scenario where the mean decision certainty was 77% for the favourable analyst forecast compared to 53.36% for the unfavourable forecast. This unexpected result in contrast to Frankel, Kothari and Weber (2002), highlights the distinction between an investor's decision to hold or to sell and their confidence in their decision. For investors that continue to display the disposition tendency, they are less confident in their decision to do so. In the capital market, we only have the opportunity to observe the buy or sell decision but not how confident investors feel about the decision they made. The confidence assessment provides us with an insight into how additional information, either confirmatory or contradictory, affects confidence in the decision made. The effect of analyst forecasts on investor decision making reflects the source credibility investors associate with a third party forecast.

To ensure that the results were not sensitive to order effects, that is, influenced by the forecasts by the order in which they were presented, another version of the case study was prepared where subjects with similar backgrounds were provided with the analyst forecast before the management forecast. The results were quantitatively similar, providing us confidence in our conclusion that investors consider analyst forecasts to be more influential than management forecasts when making investment decisions. However, we concede that the attitudes of non-professional traders may be different from those of professional traders in the market and that such opinions on analyst versus management forecasts may not be generalisable to the whole population of investors. Therefore, this may be a potential limitation of the study.

Table 4
The Effect of Stock Position, Management Forecast and Analyst Forecast on the Decision To Hold or Sell the Shares and the Certainty of Decisions

	Stock Position							
	Paper Gain				Paper Loss			
Good news management forecasts	Favourable analyst forecast (<i>n</i> = 6)		Unfavourable analyst forecast (<i>n</i> = 6)		Favourable analyst forecast (<i>n</i> = 7)		Unfavourable analyst forecast (<i>n</i> = 11)	
	Hold shares	Sell shares	Hold shares	Sell shares	Hold shares	Sell shares	Hold shares	Sell shares
Mean decision certainty (std dev)	78.75 (10.31)	75.00 (7.07)		65.83 (22.00)	77.00 (16.01)		53.36** (6.16)	72.87 (12.44)
Bad news management forecasts	Favourable analyst forecast (<i>n</i> = 6)		Unfavourable analyst forecast (<i>n</i> = 12)		Favourable analyst forecast (<i>n</i> = 11)		Unfavourable analyst forecast (<i>n</i> = 8)	
	Hold shares	Sell shares	Hold shares	Sell shares	Hold shares	Sell shares	Hold shares	Sell shares
Mean decision certainty (std dev)	75.70 (13.03)	60.00 (0.00)	60.00 (0.00)	66.09 (25.73)	68.64 (24.76)		56.50 (7.68)	64.38 (29.04)

Note: * indicates statistical significance at $p < 0.10$, ** at $p < 0.05$ and *** at $p < 0.01$ for mean differences between favourable and unfavourable analyst forecasts for hold and sell decisions separately (one tailed *t* test).

5. Conclusions

This study contributes to our understanding of how investors react to analyst and management forecasts. Drawing on attribution theory, we predict that forecasts that are contrary to investors' expectations have a greater impact on their decisions. By considering both analyst and management forecasts, we are also able to examine the relative influence of the two sources of information.

Our results indicate that analyst and management forecasts are used differently by investors in their decisions concerning shareholdings. Analyst forecasts have a stronger impact on investor decision than management forecasts. However, the decision to hold onto or sell shares is affected by the information in the management forecast that is contradictory to existing conditions. The effect of management forecasts on investors' propensity to commit the disposition effect is asymmetric, where bad news forecasts worsen the effect and good news forecasts mitigate it. Analyst forecasts, on the other hand, reduce the disposition effect, with unfavourable forecasts having a stronger impact on decisions. The differential effect between management and analyst forecasts is possibly due to external source credibility (Cotter, Tuna & Wysocki 2006; Chung & Jo 1996). Given that analyst and management forecasts contain information important for investors to adjust their expectations about firm value (Ajinkya & Gift 1984; Givoly & Lakonishok 1979), the different reactions to the information suggest strong perceptions about the incentives analyst and managers have in providing the information.

We did not find support for the prediction that bad news or unfavourable forecasts would increase investors' confidence in their decisions. Comparing the relative influence of the news released by the two sources of information, we find that analyst forecasts are more influential on investors' decision making. This suggests that investors perceive analysts to be more credible than management. Undoubtedly, managers have an informational advantage over analysts, and acquired such information when carrying out the duties of managing the firm. Investors' differential use of the information in analyst and management forecasts for decision making suggests that their concerns about managers exploiting their information advantage far outweigh their superior information set.

Our study provides preliminary evidence of investors' reactions to analyst and management forecasts. There are, however, several limitations that should be mentioned. We did not allow for factors, such as personal taxation situations and transaction costs, which might also influence investors' decisions to hold or sell their stock. We also did not include other characteristics of analyst and management forecasts that investors may consider relevant in their evaluation of the information provided by these sources. Future research can consider more complex situations by incorporating other properties of analysts and management forecasts, such as point or range forecasts and, like Krishnan & Booker (2002), the strength of the recommendations, forecasting reputation and other factors that can impact on the perceived credibility of the source of information.

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