How does the market process sequential earnings information? ☆

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ABSTRACT

Employing both experimental market and archival research designs, we examine whether the association between announcement period stock returns and contemporaneous news is influenced by previously disclosed earnings news. Our primary conclusion is that investors' response to the earnings surprise (actual earnings less the last forecast of the quarter) is conditional on the sign of prior earnings news (i.e., the forecast revision). We develop and test predictions based on behavioral theories of how investors will react to a series of earnings information. Our results suggest that the market's response to sequential analysts' forecasts is consistent with the application of an end-of-sequence (EoS) process resulting in a primacy effect.

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1. Introduction

Hogarth and Einhorn (1992) suggest in their Belief Adjustment (BA) model that when individuals are presented with sequential bits of information, their decisions are predictably influenced by how they cognitively process the information, step-by-step (SbS) or end-of-sequence (EoS). The SbS process suggests that investors will primarily be influenced by the last piece of news while the EoS process suggests that investors will be influenced not only by the last piece of news but also by earlier pieces of news. Based on the theory underlying the BA model, we posit that the cognitive processing effects observed in individual decision-making[3] potentially contribute to the market premium (penalty) for beating (missing) analysts' earnings forecasts.[4] Specifically,

we investigate whether market behavior which leads to a stock price premium (penalty) for beating (missing) analysts' earnings forecasts is consistent with investors processing sequential earnings forecasts in a step-by-step (SbS) or end-of-sequence (EoS) manner resulting in a recency or primacy effect.

Prior experimental research (Libby & Tan, 1999; Miller, 2006; Tan, Libby, & Hutton, 2002) suggests that analyst forecasts of future earnings are influenced by how quarterly earnings information is communicated to the market. That is, holding quarterly total earnings news constant (i.e., actual quarterly earnings less the first forecast of the quarter), analysts respond differently to the earnings news based on the order in which they receive the various pieces of earnings news. For example, preannounced earnings news of $1.00 and a negative earnings surprise of $(0.50) result in a significantly different analyst forecast of future earnings than preannounced earnings news of $(0.50) and a positive earnings surprise of $1.00 even though both earnings expectation paths have the same $0.50 of total quarterly earnings news. Taken together, prior research provides compelling evidence of a significant order effect associated with sequentially disclosed earnings news consistent with the predictions of the BA model.

In contrast to the prior literature, our investigation does not address the order effect aspect of the BA model. Rather, our focus is on how market participants process sequential earnings news (i.e., SbS or EoS). Specifically, we focus solely on the response of investors to the last piece of earnings news (i.e., earnings surprise) and whether cognitive processing affects the pricing of the earnings surprise holding the magnitude of the surprise constant. Fig. 1 visually demonstrates the distinction between our focus on the processing strategy applied and the impact of order. Prior research which investigates the order implications of the BA model contemplates the market response to total quarterly earnings news (quarterly return) conditioned on the sign of the revision and earnings surprise. On the other hand, our study investigates the processing

[3] Cognitive processing effects have proven robust in a variety of settings (i.e., juror decisions (Furnham, 1986); auditing (Asare & Messier, 1991); tax reporting and evaluation (Cuccia & McGill, 2000; Pei, Reckers, & Wyndelts, 1992); social judgments and attributions for behavior (Lichenstein & Scrull, 1987; Luchins & Luchins, 1984); and judgments of probability (Shanteau, 1970, 1972)).
[4] Prior research finds that the market provides a stock price premium (penalty) to firms based solely on the sign of the earnings surprise even after controlling for the magnitude of the surprise (e.g., Brown & Caylor, 2005; Kasznik & McNichols, 2002; Lopez & Rees, 2002).
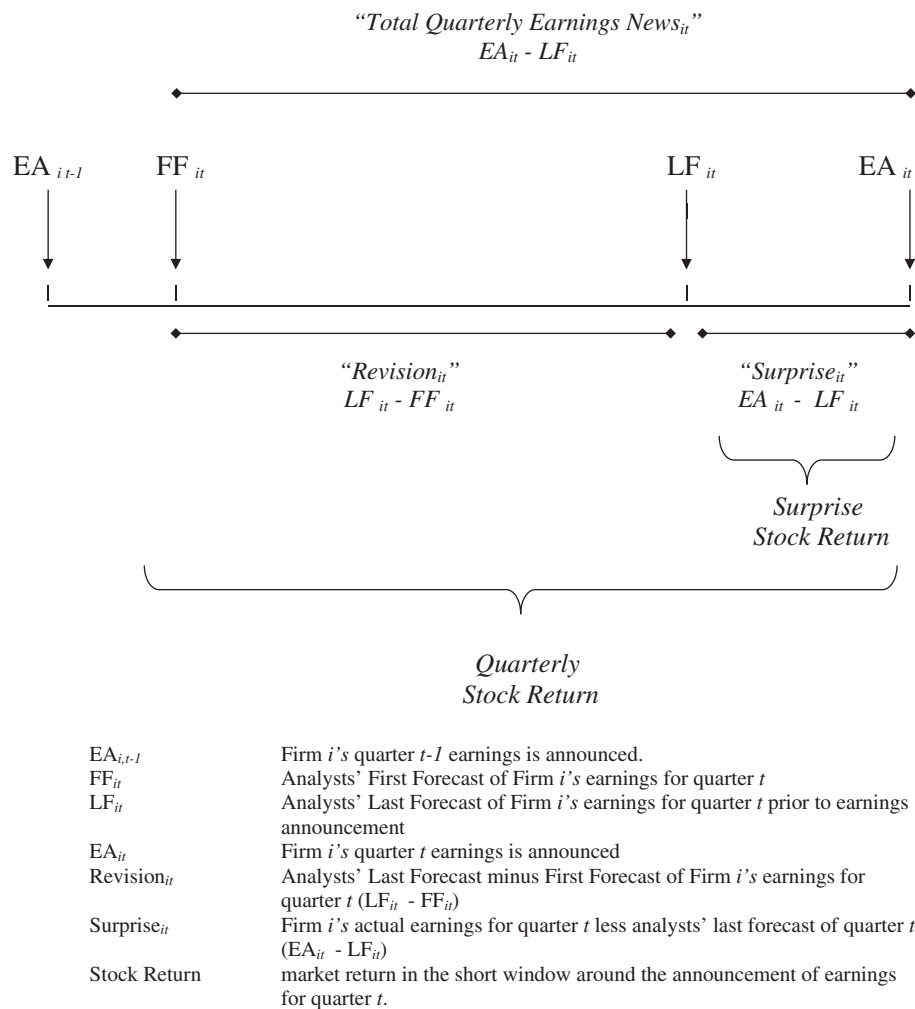
"Total Quarterly Earnings News$_{it}$"
$EA_{it} - LF_{it}$

EA $_{i\,t-1}$	FF $_{it}$		LF $_{it}$	EA $_{it}$

"Revision$_{it}$"
$LF_{it} - FF_{it}$

"Surprise$_{it}$"
$EA_{it} - LF_{it}$

*Surprise
Stock Return*

*Quarterly
Stock Return*

EA$_{i,t-1}$	Firm *i's* quarter *t-1* earnings is announced.
FF$_{it}$	Analysts' First Forecast of Firm *i's* earnings for quarter *t*
LF$_{it}$	Analysts' Last Forecast of Firm *i's* earnings for quarter *t* prior to earnings announcement
EA$_{it}$	Firm *i's* quarter *t* earnings is announced
Revision$_{it}$	Analysts' Last Forecast minus First Forecast of Firm *i's* earnings for quarter *t* (LF$_{it}$ - FF$_{it}$)
Surprise$_{it}$	Firm *i's* actual earnings for quarter *t* less analysts' last forecast of quarter *t* (EA$_{it}$ - LF$_{it}$)
Stock Return	market return in the short window around the announcement of earnings for quarter *t*.

Fig. 1. Quarterly earnings disclosure timeline.

strategy implications of the BA model by focusing on the response of the market to the earnings surprise (surprise stock return) conditioned on the sign of prior earnings news (i.e., the revision).

The sequential process of analysts issuing and subsequently revising earnings forecasts, followed by managers reporting of actual earnings at the end of the quarter appears consistent with a SbS "response mode" described by Hogarth and Einhorn's (1992) BA model. However, Hogarth and Einhorn (1992, 12) note that how individuals process information (i.e., processing strategy) is not always the same as how the information is released or presented. For example, Hogarth and Einhorn suggest that the EoS response mode (i.e., asking participants for one judgment after receiving all data) does not mean that the subjects are not applying a SbS process (i.e., updating their beliefs as they receive each piece of new information). Importantly, Hogarth and Einhorn (1992, 12–14) indicate that the manner in which a response (i.e., response mode) is sought from the subjects (SbS or EoS) does not necessarily coincide with the "processing" of the information (SbS or EoS).[5]

Hogarth and Einhorn (1992, 12) also note that when a "task demands" a SbS response mode, one cannot use an EoS process and that an "EoS response mode can be met by using either an EoS or SbS process" by participants. While they do not specifically address the

scenario where no particular response mode is demanded of participants, it is clear from their discussion that a setting of sequential pieces of information that makes no response demand of participants, such as analyst forecasts and earnings announcements, can be met by either a SbS or an EoS process.

It would be convenient to assume that market participants always use a SbS process because the earnings information is released in a sequential manner; however, prior research provides compelling reasons to believe that may not actually be the case (e.g., Hogarth & Einhorn, 1992; Nisbett, Ross, & L., 1980). Thus, the step-by-step nature of analysts issuing and subsequently revising earnings forecasts, followed by managers reporting of actual earnings at the end of the quarter does not necessarily imply that market participants will fully update their beliefs (SbS process) as the information is released since no market response is required with each release of data. Consequently, a potential unexplored possibility is that the observed market premium (penalty) for beating (missing) analysts forecasts (i.e., the earnings surprise) is, at least in part, a manifestation of the cognitive processing of sequential pieces of information by market participants at the end of the sequence (i.e., the earnings announcement date).

Prior research which examines the market premium (penalty) associated with beating (missing) analysts' earnings forecasts focuses on aggregate market behavior using capital market research designs. While this type of research design is informative in examining overall market behavior it is limited in its ability to control for confounding effects and to ascertain individual investor behavior. Accordingly, in this study we first employ an experimental market to examine whether

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[5] Similar to Hogarth and Einhorn, we use the same terminology (acronyms) to describe a response mode and a processing strategy. However, in the text we are careful to distinguish between the two by indicating when we are referring to a "response mode" versus a "processing strategy."