



# On the efficiency of intra-industry information transfers: The dilution of the overreaction anomaly



Dennis Y. Chung\*, Karel Hrazdil, Kim Trottier

Beehive School of Business, Simon Fraser University, Canada

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## ABSTRACT

We revisit the stock market anomaly documented by Thomas and Zhang (2008) and show that the apparent mispricing of information transfers has decayed over time, as the US markets experienced rapid improvements in the efficiency of the underlying price formation processes. Utilizing recent advancements in market microstructure research to estimate firm-specific proxies for market efficiency, we demonstrate that the existence of the overreaction anomaly (where stock prices of late announcers in response to the earnings reported by early announcers in the same industry are negatively related to subsequent price responses of late announcers to their own earnings reports) is specific to an earlier sample period and results from the inefficient incorporation of information into prices, largely attributable to an environment with high barriers to arbitrage. Our results indicate that the pricing efficiency of intra-industry information transfers has increased in the recent years of increased liquidity and markedly higher trading activity.

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## 1. Introduction

Earnings information transfers occur when one firm's earnings announcement provides valuation-relevant information about another firm's earnings. Prior empirical research documents that earnings announcements provide information not only about the announcing firm but also about other firms in the same industry (e.g., Foster, 1981; Han and Wild, 1990; Freeman and Tse, 1992; Ramnath, 2002).

In a more recent study, Thomas and Zhang (2008, hereafter TZ) investigate how prices of firms that have not yet announced earnings (late announcers) respond to earnings announcements of their early-announcing industry peers. TZ are the first to document an overreaction anomaly in which the stock market overestimates the intra-industry implications of early announcers' earnings for late announcers' earnings and the over-reaction is corrected when late announcers subsequently disclose their earnings. Specifically, TZ show that the price movements of late announcers in response to earnings reported by early announcers are significantly *negatively* related to the price responses to their own earnings reports.

Surprisingly, TZ also find that the investor overreaction to intra-industry information transfers is surrounded by other positive own-firm and cross-firm return relations, which imply investor underreaction to all other earnings news. The apparent mispricing raises the question of why sophisticated investors do not take advantage of the mispricing opportunities and reinforce market efficiency through arbitrage activities.

The objective and contribution of our study is to re-examine the overreaction anomaly documented by TZ. We build on TZ and posit that the apparent mispricing of information transfers is related to the level of efficiency with which stock prices reflect the new information. Specifically, in the presence of inefficiencies, the documented overreaction may have been the consequence of the market's inability to execute orders at the level of precision required to eliminate arbitrage. We expect the information transfers to be more complete for more-efficient firms that face lower arbitrage risk and to have strengthened over time as the US markets experienced rapid improvements in the efficiency of the underlying price formation processes.

Recent evidence by Chordia et al. (2014) suggests that many popular return anomalies (i.e., momentum, monthly reversals, analyst dispersion, post-earnings announcement drift, and accounting accruals) have materially diminished in both strength and significance, as the pricing efficiency of equities has increased in the

\* Corresponding author. Tel.: +1 778 782 4355; fax: +1 778 782 4920.

E-mail addresses: [dychung@sfu.ca](mailto:dychung@sfu.ca) (D.Y. Chung), [karel\\_hrazdil@sfu.ca](mailto:karel_hrazdil@sfu.ca) (K. Hrazdil), [kim\\_trottier@sfu.ca](mailto:kim_trottier@sfu.ca) (K. Trottier).

recent regime of increased liquidity and markedly higher trading activity.<sup>1</sup> Through their analysis of trends in cross-sectional predictability, Chordia et al. (2014) demonstrate that the Fama–MacBeth cross-sectional coefficient estimates and the decile-based hedge portfolio returns have attenuated from before to after decimalization for the stocks traded on major US exchanges and that many portfolio strategies have experienced markedly diminished reward-risk ratios over time.

To test our market efficiency hypothesis, we use an innovative and more comprehensive measure of limits to arbitrage, than previously used, in the context of the overreaction anomaly. Recent developments in market microstructure give us a basis to explore the evolution of the price formation process and to study how efficiently information is incorporated into security prices. We rely on the market microstructure approach developed by Chordia et al. (2008, hereafter CRS), who conclude that short-horizon return predictability (SHRP) from historical order flows is an inverse indicator of market efficiency.<sup>2</sup> The return predictability approach intends to capture the time over which market participants observe and extract information from order flows, ascertain whether there is new relevant information about firm values, take advantage of any predictable price movements, and eliminate any serial return dependence remaining after prices adjust to their new equilibrium levels. Because information is impounded in stock prices through trades, the CRS estimation of return predictability is a direct approach to assessing the efficiency of market makers, specialists, and arbitrageurs in processing current earnings information.<sup>3</sup> This innovative approach based on market microstructure allows us to study the nature of the overreaction anomaly documented by TZ and to test whether this anomaly changed over time as the market became more efficient.<sup>4</sup>

We first replicate TZ with the same period of 1973–2005 and confirm that price movements of late announcers in response to earnings reported by early announcers (*RESP*; the coefficient of interest) are significantly negatively related to the price responses

<sup>1</sup> Commonly, the periods of improved trading activity are associated with exogenous decreases in bid-ask spreads. Chordia et al. (2008) and Chung and Hrazdil (2010a, b) examine the efficiency of the price formation process across three tick size regimes identified by exogenous decreases in bid-ask spreads, and they document a substantial improvement in market efficiency for the NYSE and NASDAQ stocks.

<sup>2</sup> The use of this methodology has become established in the literature. For instance, Aktas et al. (2008) use the order imbalance and return predictability relation to examine the effects of insider trading on market efficiency; Visaltanachoti and Yang (2010) analyze the speed of convergence to market efficiency for foreign stocks listed on the NYSE; Chordia et al. (2011) analyze the evolution of return predictability over time. Chung and Hrazdil (2011) use the return predictability approach to examine the post-earnings announcement drift, and they provide comprehensive empirical evidence that the SHRP captures factors such as volatility, information asymmetry, investor sophistication, volume, size, and trading costs that affect arbitrage activities and the extent to which information is impounded in prices. These results support our motivation to use short-horizon return predictability as a broader measure of market efficiency in the context of intra-industry information transfers. In the case of the overreaction anomaly, the stronger and more positive (negative) reaction to the good (bad) news in the earnings announcements of a firm's peers should be associated with the less positive (negative) reaction later when the firm announces its own earnings. We expect the market's reaction to be reflected in the changing flows of buy and sell orders and that the short-horizon predictability of returns as a function of order imbalance provides a basis for assessing the informational efficiency of the market with respect to the information contained in the earnings announcements. Further review of the market efficiency estimations is provided in the following section.

<sup>3</sup> For financial irregularities such as the accrual anomaly that spans longer time periods, the question of whether the price process is slow to respond over a five-minute window is not really relevant for arbitrage strategies. However, for strategies designed to exploit the intra-industry information transfers over several days, a delay in the price formation process in even a short time affects their efficiency in a notable way.

<sup>4</sup> For further details, see Chordia et al. (2011) and Chordia et al. (2014), who explore the sharp uptrend in recent trading activity and the accompanying improvements in market efficiency.

to late announcers' own earnings reports. We then extend the TZ analysis to a more recent sample period of 1993–2010, over which detailed trade and quote (TAQ) intraday market data are available. The use of this TAQ sample provides the data and the basis to derive SHRP as an empirical measure of market efficiency. We partition our sample into two groups based on median SHRP (an inverse indicator of market efficiency) and two equal time periods (before and after the move to decimal pricing, an exogenous event that significantly improved the efficiency of the price formation process). We document in the multivariate setting that the coefficient of interest, although negative over all time periods, is statistically significant only during the pre-decimalization period (1993–2001). Dissecting this result further, we also find that regressions based on subsamples of more-efficient firms (below median SHRP) and time periods during the post-decimalization era (2002–2010) all yield insignificant *RESP* coefficients. We further test the robustness of our results and estimate the standard errors of the regression coefficients in all of the regressions by clustering on both the firm and the time dimensions simultaneously, an approach developed by Petersen (2009) and Thompson (2011). The robustness tests confirm our results.

Overall, our findings portray an economically intuitive picture of a strong linkage between information transfers and market efficiency, and they challenge the existence of the overreaction anomaly during the post-decimalization period. Our results provide evidence that, in the recent years of markedly higher trading activity and market efficiency, intra-industry information transfers implied by the early announcer's earnings reports are properly incorporated into the stock prices of late announcers when the late announcers subsequently report their own earnings. Our results are also consistent with the general conclusion of Chordia et al. (2014) that many popular return anomalies have diminished in strength and significance from before to after decimalization. Under the assumption that the SHRP is a valid proxy for inefficient environments with high barriers to arbitrage and the consequent extent to which information is impounded in prices, our results show that the SHRP measure captures the inefficient processing of information and can explain the predictable stock returns of industry peers before and after their earnings announcements.

The remainder of this study is organized as follows. We summarize the related research and propose our empirical predictions in Section 2. Section 3 develops measures for market efficiency, defines variables of interest, and describes the data. We discuss the main empirical results and cover robustness tests in Section 4. The final section concludes and offers opportunities for future research.

## 2. Background and hypothesis development

### 2.1. Research on intra-industry information transfers

Research on intra-industry information transfers examines the association between information released by a firm and the reaction of other (peer) firms in the same industry. The extant literature explores the peer firm reaction to a variety of announcements such as management forecasts (Han et al., 1989), dividend changes (Firth, 1996), dividend omissions (Caton et al., 2003), and unexpected earnings (Han and Wild, 1990). All studies provide evidence of a positive correlation between the announcing firm's share price movement and the returns of peer firms in the same industry.

The magnitude of the peer share price reaction is explored and tested using various research approaches, although Frost (1995) warns that conclusions may be affected by the test method used. For instance, Chan et al. (2007) find that the information transfer is stronger for large companies than for small firms. Freeman and Tse (1992) find that the effect is stronger for good-

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