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Product Market Competition and Overreaction to Intra-Industry Information Transfers*

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ABSTRACT

This study investigates the effect of product market competition on overreaction to intra-industry information transfers. Prior studies show that the stock market overreacts to information transfers resulting from the earnings announcements of early peer firms; however, few studies show how overreaction to information transfers occurs. This study reveals that investors overreact more to information transfers in higher product market competition. It also finds that in competitive environments, investors overreact to negative transfers more than they do to positive transfers. The results imply that investors do not fully understand the differential persistence between industry-wide and firm-specific news released by the industry, which is consistent with the functional fixation hypothesis. Additional analyses also reveal that overreaction to information transfers is less observed when firms are less competitive: the announcement firms are bellwether firms or firms in industries with high sales growth. The results are robust when an alternative measure of product market competition is used. This study has academic and practical implications, showing that product market competition can lead to stock market mispricing in the context of information transfers.

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1. Introduction

Earnings announcements contain information that can be useful not only to investors in firms making announcements, but also to investors in other firms in the same industry. Prior studies report that a firm's stock price reacts to the earnings announcements of industry peers (Firth 1976; Foster 1981; Freeman and Tse 1992), a phenomenon often referred to as "intra-industry information transfers." This study investigates the effect of product market competition on overreaction to intra-industry information transfers.

Previous studies focus on market efficiency in the context of information transfer and examine whether the stock prices of non-announcing peers in the same industry (late announcers) fully incorporate the earnings news of early or first announcing peers (early or first announcers). Thomas and Zhang (2008) find that U.S. investors overreact to the earnings news of early announcers. They also find that the positive correlation among early peers' earnings news causes an overreaction based on the representativeness heuristic (Tversky and Kahneman 1974). Cheng and Eshleman (2014) investigate market overreaction based on the moderated confidence hypothesis (Griffin and Tversky 1992; Bloomfield et al. 2000). However, no other studies have explored how overreaction to information transfers occurs.

Extending these studies, I predict that market overreaction to intra-industry information transfers is related to product market competition. In a competitive environment, peers' earnings announcements can convey contrary signals; as studies on intra-industry information transfers argue (Schipper 1990; Gleason et al. 2008), both positive and negative transfers occur. Positive transfers refer to the market's positive (negative) reaction to peer firms' good (bad) news. These transfers are driven primarily by industry-wide news. Negative transfers refer to the market's negative (positive) reaction to peer firms' good (bad) news. These transfers are driven mainly by the firm's competitive moves. Although positive transfers are dominant on average (Firth 1976; Foster 1981; Freeman and Tse 1992; Gleason et al. 2008), competition sometimes causes negative transfers (Lang and Lundholm 1996; Kim et al. 2008; Koo et al. 2017). Thus, product market competition can make it more difficult for investors to extract and interpret their peers' earnings announcements, which can be associated with market mispricing in information transfers.

More specifically, I predict that product market competition causes market overreactions to intra-industry information transfers in two ways. In the first scenario, competition causes negative transfers and investors overreact to them. Prior literature shows that investors do not fully understand the lower persistence of firm-specific news and overreact to firm-specific news more than they do to industry-wide news (Hui et al. 2016). The suggestion that investors do not recognize differences in the persistence of earnings components and fixate on earnings is known as the functional fixation hypothesis (Sloan 1996). Thus, the evidence provided in the literature supports the functional fixation hypothesis. If this is the case, investors will overreact to negative transfers more than positive transfers, as negative transfers are caused by firm-specific news. In the second scenario, competition increases the dominance of competitive shifting news in the peer firm's earnings announcement, but as investors do not fully recognize the increase in competitive shifting news, they wrongly identify the news as industry-wide news. Some studies argue that firm-specific news is less transparent and more difficult to detect than industry-wide news (Ayers and Freeman 1997; Elgers et al. 2008). Therefore, it is possible that in competitive environments, investors overlook a part of the competitive shifting news and overreact to positive transfers. Since both scenarios predict that product market competition causes the market to overreact to intra-industry information transfers, I first examine the relationship between product market competition and market overreactions to information transfers. Subsequently, I investigate which scenario is more compelling or, in other words, which type of transfer (positive or negative) drives market overreaction.

To address this issue, I focus on Japanese firms' earnings announcements because of several advantages: Japanese firms pay closer attention to their industry peers and consider their behaviors. For example, Abegglen and Stalk (1985) and Asaba (2002) argue that, compared to U.S. firms, Japanese firms tend to behave homogeneously or simultaneously because they want to avoid falling behind their industry peers. Similarly, Cooper (1995) indicates that since Japanese firms are usually lean enterprises, meaning they can quickly imitate the successful behavior of a certain firm. These findings have two implications. First, peer firms' accounting information is more relevant because Japanese firms' behaviors are more closely related to their industry peers. This implies that intra-industry information transfer is more important in Japan. Second, in Japan, competitive advantages are short-lived, considering that Japanese firms prefer to rapidly catch up with their peers. This implies that the persistence of earnings derived from competitive shifting is lower and investors are more likely to overreact to negative transfers when the functional fixation hypothesis is supported. Therefore, the Japanese setting provides a good environment for testing my hypothesis.

Using a sample of 22,106 firm-year observations covering 2001 to 2013, the empirical analysis confirms this prediction. The results show a pronounced market overreaction to the first announcer's earnings news when firms face high product market competition. Furthermore, I find that, in competitive environments, the market overreacts more to negative transfers than to positive transfers. With additional analyses, I further confirm that the market overreaction to intra-industry information transfers is less pronounced when firms are less competitive, that is, when negative transfers are less dominant. Specifically, I find that investors react less to bellwether firms' earnings announcements than they do to other firms' earnings announcements. I also find that overreaction does not occur in industries with high sales growth. In the main analyses, I use the Herfindahl-Hirschman Index (HHI) as a proxy for product market competition. However, the results are robust when I use a composite measure of product market competition calculated using the HHI, product substitutability, market size, and entry costs.

This study contributes to the literature in several ways. First, the study contributes to the literature on information transfers by showing a new determinant of market overreaction to information transfers. Prior literature indicates the existence of positive and negative transfers (Kim et al. 2008; Koo et al. 2017). Extending these studies, I show that investors react more to negative transfers caused by product market competition. Second, the study contributes to the literature on product market competition. Many studies focus on both the positive and negative aspects of product market competition (e.g. Karuna 2007; Li 2010; Markarian and Santalo 2014). This study provides evidence that product market competition can lead to stock market mispricing, which is consistent with the negative aspect of competition. Finally, this study contributes to the extant research into the market mispricing of industry-wide and firm-specific earnings components. Prior studies show that firm-specific earnings news is less persistent than industry-wide earnings news, and investors do not fully understand the different levels of persistence of such news (Hui and Yeung 2013; Hui et al. 2016). I examine this issue in the context of information transfers and provide evidence that investors react more to firm-specific news released by peer firms, which is consistent with the results in the existing literature.

The remainder of this paper is organized as follows. In Section 2, I review the extant literature and develop the main hypotheses. Section 3 outlines the study's research design. Section 4 describes the sample selection process and presents the descriptive statistics. Section 5 reports the main results and Section 6 provides the results of the additional analyses. Section 7 summarizes the main findings of this study and concludes the paper.

2. Literature Review and Hypotheses Development

2.1. Overreaction to Information Transfers

The prior literature provides evidence of information transfers in various contexts (e.g. Firth 1976; Foster 1981; Baginski 1987; Freeman and Tse 1992; Lang and Stulz 1992; Ali et al. 1994; Docking et al. 1997; Gleason et al. 2008; Kim et al. 2008; Pandit et al. 2011; Wang 2014; Koo et al. 2017; Brochet et al. 2018).[1] Recent studies have examined the existence and the determinants of market anomalies associated with information transfers. Thomas and Zhang (2008) provide evidence that investors in late announcers overreact to early announcers' earnings news and that price corrections occur when the late announcers report their earnings.[2] Further, Thomas and Zhang (2008) find that overreaction to information transfers is pronounced when the early announcers' earnings surprises are positively correlated with one another. This implies that investors inflate their expectations following a series of either positive or negative news released by their early peers, which is consistent with the representativeness heuristic bias discussed in behavioral finance by Tversky and Kahneman (1974).

Cheng and Eshleman (2014) investigate investors' overreaction to information transfers along a supply chain and find that a supplier's investors overreact to customer earnings announcements. Furthermore, Cheng and Eshleman (2014) find that overreaction declines with the strength of economic ties, measured by the supplier firms' sales to the customer as a percentage of the firm's total sales (or the cost of goods sold). Ramalingegowda et al. (2012) focus on information transfer through shareholdings and find that a firm's stock price overreacts to its blockholder's earnings announcements and that the blockholder's stock price underreacts to the firm's earnings announcements. They conclude that these results are consistent with the moderated confidence hypothesis, positing that investors do not fully gauge the reliability of the signal and overreact (underreact) to unreliable (reliable) news (Griffin and Tversky 1992; Bloomfield et al. 2000).

2.2. Hypotheses Development

This study investigates how overreaction to information transfer occurs. Specifically, I

[1] Some studies also focus on information transfers in Japan. For example, Otogawa and Yamaji (2006) find that there are information transfers within Japanese financial and capital corporate groups (*kinyuu* and *shihon keiretsu*). Okumura (2013) finds that information transfers are caused by earnings restatements in Japan.

[2] Kitagawa (2014) focuses on Japanese firms and finds that the late announcers' investors overreact to the first announcer's earnings news. In contrast to these studies, Ramnath (2002) and Easton et al. (2010) show that investors underreact to early peers' earnings announcements.

hypothesize that product market competition causes the market to overreact to intra-industry information transfers by focusing on the existence of two types of transfer. Previous studies have argued that there are positive and negative information transfers (Schipper 1990; Gleason et al. 2008). Positive transfers occur when the first announcer's earnings convey cash flow implications that affect the entire industry, such as changes in consumer demand, industry-wide economic trends, and growth opportunities (Firth 1976; Foster 1981; Freeman and Tse 1992). Thus, positive transfers mean that the first announcer's good (bad) news will be a positive (negative) signal about the late announcers. On the other hand, negative transfers occur when the first announcers attain good (bad) news by taking market share away from (giving market share to) late announcers (Schipper 1990; Lang and Lundholm 1996; Kim et al. 2008; Koo et al. 2017). Thus, negative transfers mean that the first announcer's good (bad) news is a negative (positive) signal about the late announcers.

While positive transfers are dominant in general (Firth 1976; Foster 1981; Freeman and Tse 1992), some research shows that competition causes negative transfers because it initiates competitive shifts among peers (Kim et al. 2008; Koo et al. 2017). For example, Kim et al. (2008) observe negative (positive) transfers when the announcer and information receiver are defined as rival (non-rival) firms in the same industry. Koo et al. (2017) find that news releases attributed to a firm's competitive moves trigger negative information transfers.

Extending previous studies, I focus on whether investors react indifferently to positive and negative transfers. Although this is an open question, based on the functional fixation hypothesis, I predict that investors overreact more to negative transfers. The functional fixation hypothesis posits that investors do not fully understand the different levels of persistence of earnings components (Sloan 1996; Hui and Yeung 2013; Hui et al. 2016). Sloan (1996) investigates the nature of the information contained in the accrual and cash flow components of earnings and finds that the accrual component is less persistent than the cash flow component and investors overreact to the accrual component. In a recent study, Hui et al. (2016) find that firm-specific earnings news is less persistent than industry-wide earnings news and that investors overreact to firm-specific earnings news. These studies imply that investors tend to overreact to information contained in the earnings component that is less persistent. As mentioned before, studies regarding information transfers argue that firm-specific news causes negative transfers, whereas industry-wide news causes positive transfers. Thus, given Hui et al.'s (2016) findings that investors overreact more to the information contained in firm-specific earnings, investors will overreact more to negative transfers than to positive transfers. Therefore, I predict that investors will overreact more to information transfers in competitive environments, where negative transfers are more pronounced. The first hypothesis is as follows:

Hypothesis 1: Market overreaction to intra-industry information transfers is more pronounced in highly competitive environments.

However, even if Hypothesis 1 is supported, there can be an alternative scenario. In this case, competition increases the dominance of competitive shifting news in peer firms' earnings announcements, but investors do not interpret it correctly and misidentify competitive shifting news as industry-wide news. Previous studies argue that firm-specific news is less timely and its valuation implications are less transparent (Ayers and Freeman 1997; Elgers et al. 2008), suggesting the difficulty of correctly detecting competitive shifting news. As mentioned above, positive transfers are dominant in general (Firth 1976; Foster 1981; Freeman and Tse 1992; Gleason et al. 2008), suggesting that peers' earnings announcements typically convey industry-wide news. Therefore, it is possible that investors overlook parts of the competitive shifting news when competition intensifies and misinterpret competitive shifting news as industry-wide news. If this is the case, then investors will overreact to *positive* transfers in competitive environments.

This scenario also leads to the prediction that investors overreact to information transfers in competitive environments. However, as the first hypothesis assumes that investors overreact to *negative* transfers in competitive environments, this prediction is inconsistent with the scenario in Hypothesis 1. Therefore, to confirm that the scenario in Hypothesis 1 is valid, I compare market overreactions to positive and negative transfers in competitive environments. If Hypothesis 1 is valid, then negative information transfers, rather than positive transfers, drive overreactions in competitive environments. Thus, Hypothesis 2 is developed:

Hypothesis 2: Negative transfers, rather than positive transfers, drive the market overreaction to intra-industry information transfers in competitive environments.

3. Research Design

3.1. Proxy for Product Market Competition

As the standard measure of product market competition, I use the HHI, which is a commonly used measure for empirical work on industrial organizations and is based on grounded theory (e.g. Tirole 1988).[3] The index is computed as the sum of the squared market shares, as shown in equation (1).

$$HHI = \sum_{i=1}^{N_j} \left(Sales_{i,j} \Big/ \sum_{i=1}^{N_j} Sales_{i,j} \right)^2 \times (-1) \quad (1)$$

where $Sales_{i,j}$ is the sales revenue of firm i in industry j computed from the *NEEDS-Financial QUEST* database. N_j is the number of firms in industry j. I compute the *HHI* for each year and industry using all firms in the *NEEDS-Financial QUEST* universe. I exclude firm-year observations for which sales data are missing. The firm-year observations are classified according to industry using the two-digit Nikkei Middle Industry Classification Code (*Nikkei gyousyu chu-bunrui*). The *HHI* is multiplied by minus one, so a small (large) negative value indicates higher (lower) product market competition.

3.2. Regression Models

3.2.1. Regression Model to Test Hypothesis 1

Extending Thomas and Zhang's (2008) work, I develop the following model to test Hypothesis 1:

[3] The literature on empirical accounting also typically adopts HHI as a proxy for product market competition (e.g. Markarian and Santalo 2014). As a robustness check, I adopt the composite measure as an alternative proxy for competition. See Section 6.2.

$$Ann.\ Return_t = \beta_0 + \beta_1\ Response_t + \beta_2\ Response \times HHID_t + \beta_3\ HHID_t + \sum Control\ Variables + \sum Year\ Dummies + \sum Industry\ Dummies + \varepsilon_t \quad (2)$$

The dependent variable in Model 2 (*Ann.* $Return_t$) represents the late announcer's three-day market-adjusted abnormal returns around their earnings announcement date in year *t*. The three-day period covers [−1, +1], where day 0 corresponds to the earnings announcement date. The market-adjusted abnormal return is measured as the raw return minus the value-weighted market return.[4]

For the independent variables, I focus on the coefficient of *Response* and the interaction term of *Response* and *HHID*. *Response* represents the late announcer's three-day market-adjusted abnormal returns in response to the first announcer's earnings announcements in year *t*. If price corrections in response to information transfers are observed around the late announcer's earnings announcement date, the coefficient of *Response* is expected to be significantly negative. *HHID* is a dummy variable equal to 1 if *HHI* is in the fourth quartile and 0 otherwise. Thus, *HHID* takes a value of 1 (0) if firms face higher (lower) product market competition. Therefore, if the reaction to information transfers becomes stronger when firms face higher product market competition, which is consistent with Hypothesis 1, the coefficient of *Response* × *HHID* in Model 2 should be significantly negative.

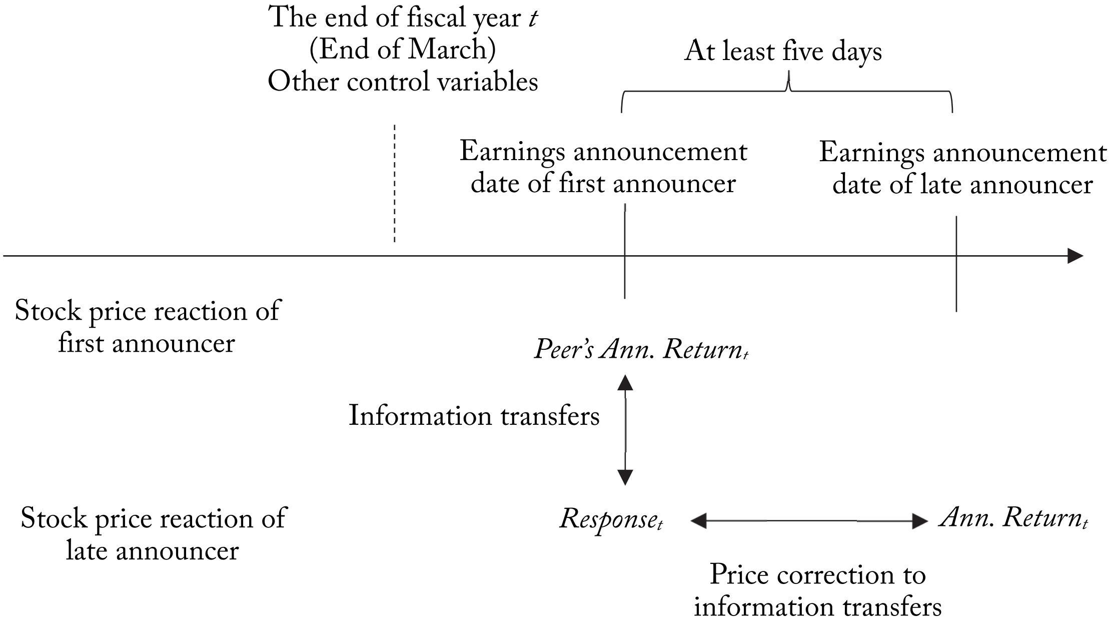
Following prior studies (Thomas and Zhang 2008; Cheng and Eshleman 2014), Model 2 includes several control variables. To control for news from the first announcer, I include *Peer's Ann. Return*, defined as the first announcer's three-day market-adjusted abnormal return around their earnings announcement date in year *t*. *Ann.* $Return_{t\text{-}1}$ is the late announcer's three-day market-adjusted abnormal return around their earnings announcement date in year *t*-1. This variable is included to control for underreaction to prior earnings news. Moreover, following Fama and French (1993), I control for the risk factors of firm size (*logMV*) and book-to-market ratio (*logBM*). In addition, one-month buy-and-hold returns (*Return 1mo.*) and six-month buy-and-hold returns (*Return 6mo.*) are included to control for the stock return reversal effect (Jegadeesh 1990) and momentum effect (Jegadeesh and Titman 1993; Chan et al. 1996), respectively.

Furthermore, I add four types of control variables that prior studies do not include (Cheng and Zhang 2008; Cheng and Eshleman 2014). First, I add the time lag between the first and late announcers' earnings announcements (*Ann. Lag*) because Givoly and Palmon (1982) find that early announcing firms tend to have higher announcement returns. Second, I add the late announcers' ROA (*ROA*) and the change in ROA (*△ROA*) to control their performance,[5] since late announcers' announcement returns (*Ann. Return*) should reflect the idiosyncratic news contained in *ROA* and *△ROA*. Third, some studies (Jiang et al. 2005; Zhang 2006) find that uncertainty affects the market response to earnings news. Thus, I add the volatility of ROA (*Std. ROA*), stock returns (*Std. Return*),

[4] The value-weighted market return is calculated based on the market value of the equity of all the listed firms, except for institutional firms, preferred securities, Japanese real estate investment trusts (J-REITs), and special investment corporations. The market values of the equity are calculated based on the stock price at the end of the previous operating day. As a robustness check, I use equal-weighted market returns and find that the main conclusion does not change.

[5] Although existing literature (Thomas and Zhang 2008; Cheng and Eshleman 2014) controls total accruals (*ACC*), my model does not include it because *ACC* is included in *ROA*. As a robustness check, I regress the model that includes *ACC* and find that the conclusion does not change.

FIGURE 1. TIMETABLE OF MAIN VARIABLES



and industry return volatility (*Std. Industry Return*) to control for firm- and industry-level uncertainty.

Fourth, I consider the effects of the Japanese ownership structure. Studies argue that cross-shareholdings and stable shareholdings are unique features in the Japanese equity market (Hoshi et al. 1990; Aoki and Patrick 1995; Douthett and Jung 2001; Shuto and Kitagawa 2011; Shuto and Iwasaki 2014). Moreover, such an ownership structure affects the market response to earnings news (Fang and Jung 2001; Fang and Wong 2002). Therefore, I control for the proportion of stable shareholdings (*Stable Own.*) and cross-shareholdings among firms (*Cross Own.*).[6,7] Finally, I include year and industry dummies to control for fixed year and industry effects.

The expected signs of the coefficients of $Ann\ Return_{t\text{-}1}$, *logBM*, *Return 6mo.*, *ROA*, and *△ROA* are positive, and those of *logMV*, *Return 1mo.*, *Ann. Lag*, *Std. ROA*, *Std. Return*, and *Std. Industry Return* are negative. I do not predict the specific signs of the coefficients of *Cross Own.* and *Stable Own.* The time graph and detailed definitions of the variables are shown in Figure 1 and the appendix, respectively.

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[6] Stable shareholders include financial institutions, trust banks, and other financial institutions (e.g. brokerage companies and securities financing companies). They also include parent companies and exclude domestic companies that are defined as cross-shareholders. Cross-shareholders include cross-shareholding domestic companies listed on the Japanese stock markets at the end of the fiscal year.

[7] In the Japanese equity market, foreign ownership has increased in recent years. Therefore, I include the proportion of foreign ownership (*Foreign Own.*) into the model (2) as a robustness check. The result shows that my main conclusion does not change after controlling for foreign ownership.

3.2.2. Regression Model to Test Hypothesis 2

To test Hypothesis 2, I develop Model 3 and estimate for the high-competition subsample (*HHID* = 1). All variables, except for *Neg. Transfer* and *Weak Transfer*, are defined in the previous subsection.

$$\begin{aligned} Ann.\ Return_t = {} & \beta_0 + \beta_1\ Response_t + \beta_2\ Response \times Neg.\ Transfer_t \\ & + \beta_3\ Response \times Weak\ Transfer_t + \beta_4\ Neg.\ Transfer_t \\ & + \beta_5\ Weak\ Transfer_t + \sum Control\ Variables \\ & + \sum Year\ Dummies + \sum Industry\ Dummies + \varepsilon_t \end{aligned} \quad (3)$$

Here, *Neg. Transfer* is a dummy variable equal to 1 if *Response* × *Peer*'s *Ann. Return* is in the first quartile (this quartile contains firms with large negative information transfers) and 0 otherwise. *Weak Transfer* is a dummy variable equal to 1 if *Response* × *Peer*'s *Ann. Return* is in the second or third quartiles and 0 otherwise.

As defined earlier, *Response* is the late announcer's stock response to the first peer's earnings announcement and *Peer's Ann. Return* is the first peer's announcement return. Therefore, the same sign for *Response* and *Peer's Ann. Return* (i.e. *Response* × *Peer*'s *Ann. Return* is positive) means that the late announcer's investors react positively (negatively) to the first peer's good (bad) news, which is consistent with the occurrence of positive transfers (Foster 1981; Thomas and Zhang 2008). However, different signs for *Response* and *Peer's Ann. Return* (i.e. *Response* × *Peer*'s *Ann. Return* is negative) mean that the late announcer's investors react negatively (positively) to the first peer's good (bad) news, consistent with the occurrence of negative transfers (Foster 1981; Thomas and Zhang 2008). However, the sample includes firms with *Peer's Ann. Return* × *Response* of almost zero. These firms can be noise when comparing the market overreaction to positive and negative transfers. Thus, I divide the sample into three groups: a positive transfer sample (firms whose *Response* × *Peer*'s *Ann. Return* is in the fourth quartile), a weak transfer sample (firms whose *Response* × *Peer*'s *Ann. Return* is in the second or third quartiles), and a negative transfer sample (firms whose *Response* × *Peer*'s *Ann. Return* is in the first quartile). Subsequently, I developed a negative transfer sample dummy (*Neg. Transfer*) and weak transfer sample dummy (*Weak Transfer*).

I focus on the coefficient of the interaction term of *Response* and *Neg. Transfer*. If the market reaction to intra-industry information transfers in competitive environments is driven by negative rather than positive transfers, which is consistent with Hypothesis 2, the coefficient of *Response* × *Neg. Transfer* will be significantly negative. I do not predict the sign of the coefficient of *Response* × *Weak Transfer*.

4. Sample and Descriptive Statistics

4.1. Sample Selection

I obtained financial statement data from the *NEEDS-Financial QUEST* database of Nikkei, Inc.[8] and stock price data from the *Nikkei Portfolio Master* database of Financial Data Solutions, Inc. The data on stable shareholdings and cross-shareholdings are obtained from the *Data Package of Cross-Shareholding and Stable Shareholding* database of the NLI Research Institute. My initial

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[8] If the firm does not report consolidated financial statements, I used parent-only financial statement data.

TABLE 1. SAMPLE SELECTION CRITERIA

Criteria	Obs.
Japanese listed firms from January 2001 to December 2013 excluding financial institutions	58,494
Less: Fiscal year does not end in March	(18,539)
Less: Firms that changed fiscal year end during the calculation of variables	(255)
Less: Firms that correspond to first announcers	(574)
Less: First announcer's earnings announcement date does not precede firm's earnings announcement date by at least five calendar days	(1,183)
Less: The necessary data for calculating first announcer's variables (*Peer's Ann. Return*) is not available	(269)
Less: The necessary data for calculating other variables (*Ann. Return*, *Response*, *Ann. Return*$_{t\text{-}1}$, *logMV*, *logBM*, *Return 1mo.*, *Return 6mo.*, *ROA*, *ΔROA*, *Std. ROA*, *Std. Return*, *Std. Industry Return*, *Cross Own.*, *Stable Own.*) are not available	(15,568)
Final sample	22,106

Notes: Table 1 provides details of the sample selection criteria. Financial statement data were obtained from the *NEEDS-Financial QUEST database* of Nikkei. I used consolidated financial statements. If consolidated financial statements were not available, I used parent-only financial statements. Stock price data were obtained from the *Nikkei Portfolio Master* database of Financial Data Solutions, Inc. I obtained data on cross-shareholdings and stable shareholdings from the *Data Package of Cross-Shareholding and Stable Shareholding* database of the NLI Research Institute.

sample consists of 58,494 firm-year observations covering 2001 to 2013.[9] The initial sample focuses on annual earnings announcements and does not include financial institutions, such as banks, securities companies, insurance companies, and credit and leasing firms. A total of 18,539 firm-year observations were deleted from the initial sample because this study focuses on firms with fiscal year-ends in March to ensure that a firm and its peers report results for the same fiscal year. Further, I deleted 255 firm-year observations for firms that changed their accounting periods during the analysis period. In addition, I deleted 574 firm-year observations because they corresponded to the first announcer. I imposed the requirement that the first announcer's earnings announcement date must precede the late announcer's earnings announcement date by at least five calendar days to avoid an overlap between *Ann. Return* and *Response*. Consequently, 1,183 firm-year observations were deleted. After deleting the observations with data missing on the first announcer (*Peer's Ann. Return*) and other variables (*Ann. Return*, *Response*, *Ann. Return*$_{t\text{-}1}$, *logMV*, *logBM*, *Return 1mo.*, *Return 6mo.*, *Ann. Lag*, *ROA*, *ΔROA*, *Std. ROA*, *Std. Return*, and *Std. Industry Return*), the final sample consisted of 22,106 firm-year observations. The sample selection procedure is shown in Table 1.

4.2. Descriptive Statistics

Table 2 summarizes the descriptive statistics. For each year, I winsorized all sequential variables

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[9] The *NEEDS-Financial QUEST* database includes data on earnings announcements from 2000. I include lagged *Ann. Return* as a control variable, so my sample period starts in 2001.

TABLE 2. DESCRIPTIVE STATISTICS

	Mean	Median	Max	Min	SD	Skewness	Kurtosis	Obs.
Ann. Return	0.006	0.002	0.328	-0.229	0.065	0.747	6.196	22,106
Response	0.000	-0.003	0.227	-0.132	0.040	1.016	7.393	22,106
Peer's Ann. Return	0.017	0.005	0.293	-0.175	0.066	1.111	5.829	22,106
Ann. Return$_{t-1}$	0.009	0.005	0.335	-0.221	0.063	0.615	5.853	22,106
logMV	9.919	9.727	14.745	5.712	1.691	0.471	2.893	22,106
logBM	0.058	0.116	1.860	-2.589	0.691	-0.518	3.553	22,106
Return 1mo.	0.055	0.031	1.109	-0.363	0.157	1.618	8.837	22,106
Return 6mo.	0.059	0.012	2.798	-0.805	0.385	1.663	9.528	22,106
Ann. Lag	4.308	4.543	5.252	1.609	0.760	-2.450	7.537	22,106
ROA	0.015	0.018	0.204	-0.424	0.053	-2.254	15.042	22,106
Δ ROA	0.000	0.001	0.347	-0.333	0.050	-0.153	12.511	22,106
Std. ROA	0.030	0.018	0.303	0.002	0.038	3.702	20.633	22,106
Std. Return	0.103	0.088	0.472	0.021	0.060	2.053	9.378	22,106
Std. Industry Return	0.055	0.053	0.127	0.018	0.018	0.618	3.747	22,106
Cross Own.	0.096	0.077	0.381	0.000	0.089	0.944	3.290	22,106
Stable Own.	0.146	0.067	0.700	0.000	0.182	1.491	4.034	22,106

Notes: Table 2 presents the descriptive statistics. All sequential variables are winsorized at 1% and 99% of the respective distributions. Please see the definition of variables in the Appendix.

at 1% and 99% of their respective distributions to mitigate the impact of outliers. Table 2 shows the mean value of *Peer's Ann. Return* is greater than that of *Ann. Return*, suggesting that the first announcer's earnings return tends to be higher than that of late announcers. Furthermore, the mean value of *Response* is almost 0. These results are consistent with the findings of prior studies, such as Thomas and Zhang (2008).

Table 3 reports the descriptive statistics for the HHI (*HHI*) by industry and shows that service, construction, and retail trade industries are in relatively higher competition. The shipbuilding and repairing, mining, and rubber product industries are in lower competition. These tendencies are consistent with prior studies in Japan (e.g. Iwasaki et al. 2014).

Table 4 presents the Pearson and Spearman rank-order correlation matrices for the regression variables. *Response* is significantly and positively associated with *Peer's Ann. Return*, which is consistent with prior studies' reports that positive transfers are dominant (e.g. Firth 1976; Foster 1981; Freeman and Tse 1992). Moreover, *Response* is significantly and negatively associated with *Ann. Return*, suggesting that the late announcer's investors misprice from the first announcer's news and that price corrections occur when the late announcers report their earnings; this is consistent with the findings of Thomas and Zhang (2008).[10]

[10] I also compute the variance inflation factor (VIF) to check for multicollinearity and I find that all the mean values of VIF are below 4. As the standard VIF value for multicollinearity detection is 10, I conclude that there is no multicollinearity in the regression models.

TABLE 3. DESCRIPTIVE STATISTICS FOR PRODUCT MARKET COMPETITION (HHI) BY INDUSTRY

Code	Industry group name	Mean	Median	SD	Obs.
1	Foods	-0.051	-0.050	0.011	967
3	Textile Products	-0.102	-0.108	0.014	590
5	Pulp and Paper	-0.142	-0.145	0.010	182
7	Chemicals	-0.029	-0.030	0.002	1,637
9	Drugs	-0.063	-0.068	0.011	461
11	Petroleum	-0.211	-0.207	0.017	50
13	Rubber Products	-0.340	-0.347	0.025	150
15	Stone, Clay and Glass Products	-0.092	-0.092	0.007	512
17	Iron and Steel	-0.125	-0.124	0.006	576
19	Nonferrous Metal and Metal Products	-0.054	-0.052	0.010	1,155
21	Machinery	-0.036	-0.035	0.003	1,974
23	Electric and Electronic Equipment	-0.049	-0.048	0.002	2,302
25	Shipbuilding and Repairing	-0.452	-0.469	0.034	55
27	Motor Vehicles and Auto Parts	-0.133	-0.133	0.006	615
29	Transportation Equipment	-0.129	-0.133	0.021	120
31	Precision Equipment	-0.083	-0.088	0.013	406
33	Other Manufacturing	-0.061	-0.061	0.004	649
35	Fish and Marine Products	-0.275	-0.274	0.010	42
37	Mining	-0.325	-0.297	0.138	35
41	Construction	-0.022	-0.022	0.003	1,648
43	Wholesale Trade	-0.053	-0.052	0.004	2,304
45	Retail Trade	-0.027	-0.028	0.003	787
53	Real Estate	-0.044	-0.044	0.009	547
55	Railroad Transportation	-0.073	-0.074	0.001	299
57	Trucking	-0.126	-0.127	0.007	285
59	Sea Transportation	-0.265	-0.271	0.013	107
61	Air Transportation	-0.324	-0.310	0.057	31
63	Warehousing and Harbor Transportation	-0.069	-0.076	0.021	390
65	Communication Services	-0.158	-0.148	0.018	223
67	Utilities: Electric	-0.165	-0.165	0.002	51
69	Utilities: Gas	-0.257	-0.256	0.004	49
71	Services	-0.011	-0.011	0.001	2,907

Notes: Table 3 presents the descriptive statistics for the HHI (*HHI*) by industry. In this study, *HHI* is defined as the sales-based HHI times minus one. The definition of each industry is based on the Nikkei Middle Industry Classification (33 industries). The code in the table refers to the two-digit Nikkei Middle Industry Classification Code.

TABLE 4. PEARSON AND SPEARMAN CORRELATIONS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) *Ann. Return*		**-0.02**	**-0.02**	**0.09**	-0.01	**0.06**	0.00	**-0.12**	**0.02**	**-0.07**	0.00	**-0.04**	**-0.03**	0.00	**0.04**	**0.03**
(2) *Response*	**-0.02**		**0.07**	0.01	**0.04**	0.01	0.00	**0.02**	**-0.07**	**0.02**	**0.04**	0.01	0.00	**0.02**	0.01	**0.04**
(3) *Peer's Ann. Return*	**-0.02**	**0.07**		-0.01	0.00	**-0.02**	0.01	**0.09**	**-0.09**	0.01	**0.04**	**0.05**	**0.02**	**0.08**	**-0.03**	-0.02
(4) *Ann. Return$_{t-1}$*	**0.10**	0.01	**-0.02**		-0.01	0.01	**0.02**	**-0.02**	**0.02**	**0.05**	**0.15**	**-0.05**	-0.01	**-0.02**	**0.03**	**0.02**
(5) *logMV*	**-0.03**	0.00	0.00	**-0.02**		**-0.44**	0.00	**0.17**	**-0.26**	**0.31**	**0.06**	**-0.18**	**-0.08**	**-0.05**	**0.06**	0.02
(6) *logBM*	**0.07**	0.02	-0.01	**0.02**	**-0.40**		0.01	**-0.23**	**0.03**	**-0.33**	**-0.10**	**-0.14**	**-0.13**	**0.02**	**0.24**	**0.05**
(7) *Return 1mo.*	-0.01	0.01	0.00	**0.02**	**-0.03**	-0.01		**0.32**	**0.05**	**-0.08**	**0.02**	**0.03**	**0.18**	**0.22**	**0.04**	**0.03**
(8) *Return 6mo.*	**-0.14**	-0.01	**0.08**	**-0.03**	**0.14**	**-0.27**	**0.37**		**-0.06**	**0.25**	**0.32**	**-0.05**	**-0.04**	**0.02**	**0.05**	**-0.02**
(9) *Ann. Lag*	-0.01	-0.01	**-0.02**	0.00	**-0.22**	**0.08**	0.00	-0.01		**-0.12**	**-0.02**	**0.03**	**0.06**	0.00	0.01	**-0.16**
(10) *ROA*	**-0.05**	-0.01	**0.03**	**0.06**	**0.28**	**-0.17**	**-0.07**	**0.23**	**-0.07**		**0.37**	**-0.12**	**-0.12**	**-0.05**	**-0.11**	**-0.07**
(11) *ΔROA*	0.00	**0.02**	**0.02**	**0.12**	**0.04**	**-0.06**	0.00	**0.25**	0.01	**0.47**		0.01	0.01	**-0.02**	**0.02**	0.01
(12) *Std. ROA*	**-0.03**	0.02	**0.03**	**-0.04**	**-0.19**	**-0.23**	**0.04**	-0.01	**0.04**	**-0.34**	**-0.02**		**0.39**	**0.23**	**-0.27**	**-0.08**
(13) *Std. Return*	**-0.02**	**0.02**	**0.02**	**0.05**	**-0.14**	**-0.21**	**0.26**	**0.14**	**0.04**	**-0.20**	**0.02**	**0.40**		**0.36**	**-0.17**	**-0.03**
(14) *Std. Industry Return*	0.01	**0.04**	**0.10**	0.00	**-0.04**	0.01	**0.24**	**0.08**	**-0.05**	**-0.08**	**-0.04**	**0.16**	**0.32**		**-0.11**	**-0.03**
(15) *Cross Own.*	**0.03**	-0.01	**-0.04**	**0.02**	**0.02**	**0.23**	0.00	0.01	**0.10**	-0.02	**0.02**	**-0.24**	**-0.16**	**-0.09**		-0.01
(16) *Stable Own.*	**0.02**	**0.03**	-0.02	**0.02**	**-0.06**	-0.01	0.00	**-0.02**	**-0.22**	0.01	0.00	**-0.04**	-0.01	0.01	**-0.24**	

Notes: Table 4 presents the Pearson and Spearman correlations. The top (bottom) diagonal in the table shows the Spearman (Pearson) correlations. All sequential variables are winsorized at 1% and 99% of the respective distributions. Bold indicates statistical significance at a less than 0.01 level of significance using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

5. Empirical Results

5.1. Portfolio Test

Table 5 presents the results of the portfolio test. In Panel A of Table 5, the firms are divided into 10 decile portfolios based on *Peer's Ann. Return* for each year, and the mean value of *Response* is shown. In the pooled sample, the mean value of *Response* tends to be larger, as *Peer's Ann. Return* increased from D1 to D10. In addition, the three-day D10–D1 hedge portfolio return is 0.007, which is significantly different from 0.

Subsequently, I divide the firms into four groups based on the HHI quartiles by year and further sort each group into 10 portfolios based on *Peer's Ann. Return* by year. In all HHI quartile samples, the three-day D10–D1 hedge portfolio returns are significantly positive.[11] However, the hedge portfolio returns are likely to be lower in the third and fourth HHI quartile samples, which contain firms facing greater product market competition. This could be because the positive and negative information transfers offset each other.

Panel B of Table 5 summarizes the proportion of positive and negative information transfers for the full sample and each HHI quartile subsample. Here, I classify firms into a positive (negative) transfer group if the sign of *Response* × *Peer*'s *Ann. Return* is positive (negative). In the pooled sample, the proportion of positive transfers was slightly higher than that of negative transfers. More importantly, I find that the proportion of negative (positive) transfers increases (decreases) as the level of the HHI increases. The proportions in the lowest and highest HHI quartiles were statistically different. This implies that negative transfers will become more pronounced as product market competition increases.

In Panel C of Table 5, I divide the firms into 10 decile portfolios based on the *Response* for each year and show the mean value of *Ann. Return*. In the pooled sample, the mean value of *Ann. Return* tended to decrease as the *Response* increased from D1 to D10. In addition, the three-day D10–D1 hedge portfolio return is -0.006 and significantly different from 0. These results suggest that Japanese investors typically overreact to information transfers, which is similar to the findings of Thomas and Zhang (2008).

Furthermore, I divide the firms into four groups based on the *HHI* quartiles by year and further sort each group into 10 portfolios based on the *Response* by year. In the third and fourth *HHI* quartiles (these quartiles contain firms facing higher competition), the mean value of *Ann. Return* decreases as the *Response* increases from D1 to D10 and the three-day D10–D1 hedge portfolio return is significantly different from 0. In contrast, in the other quartiles, the three-day D10–D1 hedge portfolio returns were not significantly different from 0. This result suggests that an overreaction to information transfers is observed when firms face higher product market competition, which supports Hypothesis 1.

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[11] Note that *Peer's Ann. Return* and *HHI* are not measured by firm-year level but by industry-year level—the observations of each of the deciles differ. Therefore, the pooled D10–D1 is not necessarily equal to the average of D10–D1 in the HHI quartiles.

TABLE 5. PORTFOLIO TEST BY THE LEVEL OF PRODUCT MARKET COMPETITION

Panel A: The Mean Response by Quartile Based on HHI and by Decile Based on Peer's Ann. Return

		Level of product market competition (HHI)			
	Pooled	1 (Lowest)	2	3	4 (Highest)
D1 (Lowest)	-0.002	-0.003	-0.008	-0.001	0.005
D2	-0.007	0.002	-0.011	-0.004	-0.034
D3	-0.004	-0.002	-0.001	0.001	0.000
D4	0.002	-0.003	-0.016	0.010	-0.006
D5	0.000	0.001	0.000	0.006	-0.004
D6	-0.001	-0.001	0.003	0.008	-0.006
D7	0.003	0.008	0.006	-0.003	-0.011
D8	0.002	0.001	-0.002	0.001	0.000
D9	0.000	0.008	-0.001	-0.005	0.010
D10 (Highest)	0.005	0.007	0.002	0.005	0.013
D10 – D1	0.007***	0.010***	0.009***	0.006**	0.007**
t-stat.	(5.599)	(4.498)	(4.063)	(2.377)	(2.325)
Obs.	22,106	6,941	5,306	5,611	4,248

Panel B: Proportion of Positive and Negative Transfers by Quartile Based on HHI

		Level of product market competition (HHI)			
	Pooled	1 (Lowest)	2	3	4 (Highest)
Positive transfers	51.87%	54.07%	54.54%	50.04%	47.34%
Obs.	11,466	3,753	2,894	2,808	2,011
Negative transfers	48.13%	45.93%	45.46%	49.96%	52.66%
Obs.	10,640	3,188	2,412	2,803	2,237
χ^2-stat. (Lowest = Highest)		71.040 (Pr. = 0.000)			

Panel C: The Mean Ann. Return by Quartile Based on HHI and by Decile Based on Response

		Level of product market competition (HHI)			
	Pooled	1 (Lowest)	2	3	4 (Highest)
D1 (Lowest)	0.007	0.005	0.005	0.011	0.006
D2	0.007	0.007	0.006	0.010	0.002
D3	0.009	0.007	0.009	0.007	0.006
D4	0.005	0.005	0.006	0.004	0.007
D5	0.007	0.007	0.012	0.010	0.002
D6	0.007	0.010	0.010	0.010	0.002
D7	0.008	0.009	0.004	0.007	0.006
D8	0.008	0.006	0.008	0.008	0.006
D9	0.005	0.006	0.002	0.008	0.004
D10 (Highest)	0.001	0.003	0.003	0.004	-0.006
D10 – D1	-0.006**	-0.003	-0.003	-0.007*	-0.012**
t-stat.	(-2.313)	(-0.591)	(-0.647)	(-1.651)	(-2.002)
Obs.	22,106	6,941	5,306	5,611	4,248

Notes: Table 5 of Panel A describes the mean *Response* by quartile based on *HHI* and by decile based on *Peer's Ann. Return*. Panel B shows the proportion of positive information transfers (i.e.

Response × *Peer*'s *Ann. Return* is positive) and negative information transfers (i.e. *Response* × *Peer*'s *Ann. Return* is negative) according to the level of HHI. Panel C shows the mean *Ann. Return* by quartile based on *HHI* and by decile based on *Response*. For each year, I divide the sample into four groups based on *HHI*; each group is further sorted into 10 portfolios based on *Peer's Ann. Return* (*Response*). All sequential variables are winsorized at 1% and 99% of the respective distributions. *** and ** indicate the value is significantly different from 0 at the 1% and 5% levels, respectively, using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

5.2. Regression Analysis

Table 6 presents the regression results for Model 2. To mitigate the cross-sectional and time-series dependence problems of the panel data, I use standard errors clustered at the firm and year levels, as proposed by Petersen (2009). First, I divide the sample into two subsamples based on *HHID* and estimate the regression model (2) (without *Response* × *HHID* and *HHID*) for each subsample. The result shows that the coefficient of *Response* is negative and significant only at the 10% level in the low competition sample (*HHID* = 0). On the other hand, in the high-competition sample (*HHID* = 1), the coefficient of *Response* is significantly negative at the 5% level and more negative than in the low competition sample.

Then, I estimate Model 2 for the full sample. The results show that the coefficient of the interaction term of *Response* and *HHID* is significantly negative at the 5% level. This suggests that overreaction to the first peer's earnings announcement is significantly higher in highly competitive environments, which is consistent with Hypothesis 1.

As for the control variables, the coefficients of *Ann.* $Return_{t\text{-}1}$ and *ΔROA* were found to be significantly positive in the pooled sample and both subsamples. The coefficient of *logBM* is significantly positive in the pooled and low-competition samples. The coefficients of *Ann. Lag* and *Std. ROA* are significantly negative in the pooled and high-competition sample. These results are consistent with expectations.[12]

Table 7 provides the regression results for Model 3. As mentioned earlier, my main focus is on the results for the high-competition sample. However, for comparison, the table also reports the results for the low-competition sample. In the high-competition sample, the coefficient of *Response* × *Neg. Transfer* was significantly negative at the 5% level. The result of the *F*-test reveals that the sum of the coefficients of *Response* and *Response* × *Neg. Transfer* is significantly different from zero. These results suggest that the market overreaction to information transfers in competitive environments is driven by negative rather than positive transfers, which is consistent with Hypothesis 2. On the other hand, both the coefficients of *Response* and *Response* × *Weak Transfer* are not significant. The result of the *F*-test reveals that the sum of the coefficients of *Response* and *Response* × *Weak Transfer* is not different from zero. This suggests that market overreaction to information transfers in competitive environments is driven only by negative transfers. Interestingly, in the low-competition sample, the coefficient of *Response* × *Neg. Transfer* is insignificant, although the result of the *F*-test reveals that the sum of the coefficients of *Response* and *Response* × *Neg. Transfer* is significantly different from zero. This result means that the market overreaction due to

[12] The coefficient of *Return 6mo.* is significantly negative and that of *Return 1mo.* is not significant, which are inconsistent with the predictions. One possible explanation is that *Return 6mo.* reflects a reversal effect because of the high correlation between *Return 6mo.* and *Return 1mo.* (see Table 4). In fact, the coefficient on *Return 1mo.* becomes significantly negative when *Return 6mo.* is eliminated from the independent variable.

TABLE 6. EFFECT OF PRODUCT MARKET COMPETITION ON OVERREACTION (HYPOTHESIS 1)

		(1) Low-competition sample (*HHID* = 0)		(2) High-competition sample (*HHID* = 1)		(3) Pooled sample	
	Pred. sign	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Intercept	?	0.019**	(2.013)	0.047***	(2.561)	0.024***	(3.399)
Response	–	-0.034*	(-1.815)	-0.071**	(-2.270)	-0.034*	(-1.799)
Response × *HHID*	–					-0.050**	(-1.983)
HHID	?					0.003	(0.389)
Peer's Ann. Return	+	0.018	(0.943)	-0.055**	(-2.307)	0.008	(0.582)
Ann. Return$_{t-1}$	+	0.087***	(4.842)	0.054**	(2.040)	0.081***	(4.679)
logMV	–	0.000	(0.182)	-0.001	(-1.362)	-0.000	(-0.189)
logBM	+	0.003***	(2.580)	0.003	(1.302)	0.003**	(2.489)
Return 1mo.	–	-0.001	(-0.190)	-0.008	(-1.041)	-0.001	(-0.285)
Return 6mo.	+	-0.018***	(-3.885)	-0.019***	(-3.014)	-0.019***	(-3.909)
Ann. Lag	–	-0.002	(-1.587)	-0.004**	(-2.240)	-0.002*	(-1.838)
ROA	+	-0.068***	(-3.907)	-0.003	(-0.113)	-0.044***	(-2.800)
Δ ROA	+	0.074***	(4.339)	0.062**	(2.265)	0.068***	(4.328)
Std. ROA	–	-0.010	(-0.556)	-0.072***	(-3.686)	-0.033*	(-1.816)
Std. Return	–	-0.023	(-1.128)	-0.010	(-0.271)	-0.019	(-0.796)
Std. Industry Return	–	0.035	(0.370)	0.092	(0.405)	0.043	(0.592)
Cross Own.	?	0.010	(1.259)	-0.018	(-1.030)	0.006	(0.902)
Stable Own.	?	-0.000	(-0.111)	0.004	(0.736)	0.001	(0.381)
Year Dummies		Yes		Yes		Yes	
Industry Dummies		Yes		Yes		Yes	
Adj. R^2		0.062		0.066		0.061	
Obs.		17,858		4,248		22,106	

Notes: Table 6 reports the regression results of Model 2 to test Hypothesis 1. All sequential variables are winsorized at 1% and 99% of the respective distributions. The *t*-statistics in parentheses are corrected for heteroscedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year levels, as proposed by Petersen (2009). ***, **, and * indicate the value is significantly different from 0 at the 1%, 5%, and 10% levels, respectively, using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

negative transfers is more distinct in the high-competition sample. This is consistent with economic theory, which states that competition lessens the persistence of firm-specific earnings (e.g. Waring 1996; Hui and Yeung 2013; Hui et al. 2016).[13]

[13] As a robustness check, I divide the sample into two subsamples based on the median value of *HHI* and regress *Ann. Return* on *Response* in each subsample. The empirical results show that the coefficient of *Response* in the above-median sample (-0.056) is significantly negative (t = -2.406), although the significance level is lower than that in the fourth quartile sample. In contrast, in the subsample with *HHI* below the median, the coefficient of *Response* (-0.037) is insignificant (t = -1.596). These results are consistent with Hypothesis 1. Moreover, the regression results of Model 3 reveal that the coefficient of *Response*×*Neg. Transfer* (-0.110) is significantly negative (t = -2.750), which is consistent with Hypothesis 2. These results suggest that my conclusion does not depend on the cut-off point of the HHI.

TABLE 7. EFFECT OF PRODUCT MARKET COMPETITION ON OVERREACTION TO POSITIVE AND NEGATIVE INFORMATION TRANSFERS (HYPOTHESIS 2)

		(1) Low-competition sample (*HHID* = 0)		(2) High-competition sample (*HHID* = 1)	
	Pred. sign	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Intercept	?	0.020**	(2.226)	0.045**	(2.344)
Response	–	-0.020	(-0.834)	-0.009	(-0.246)
Response × Neg. Transfer	–	-0.041	(-1.069)	-0.139**	(-2.454)
Response × Weak Transfer	?	0.003	(0.062)	0.018	(0.266)
Neg. Transfer	?	0.000	(0.139)	0.004	(0.864)
Weak Transfer	?	-0.002	(-1.498)	0.002	(0.501)
Peer's Ann. Return	+	0.010	(0.539)	-0.067***	(-3.089)
Ann. Return$_{t-1}$	+	0.087***	(4.850)	0.055**	(2.077)
logMV	–	0.000	(0.208)	-0.001	(-1.280)
logBM	+	0.003***	(2.581)	0.003	(1.318)
Return 1mo.	–	-0.001	(-0.267)	-0.010	(-1.346)
Return 6mo.	+	-0.018***	(-3.898)	-0.019***	(-3.035)
Ann. Lag	–	-0.002	(-1.558)	-0.004**	(-2.195)
ROA	+	-0.068***	(-3.880)	-0.004	(-0.141)
Δ ROA	+	0.074***	(4.322)	0.063**	(2.402)
Std. ROA	–	-0.011	(-0.594)	-0.075***	(-4.222)
Std. Return	–	-0.024	(-1.186)	-0.014	(-0.367)
Std. Industry Return	–	0.030	(0.311)	0.162	(0.865)
Cross Own.	?	0.010	(1.264)	-0.018	(-1.005)
Stable Own.	?	-0.000	(-0.096)	0.004	(0.747)
Year Dummies		Yes		Yes	
Industry Dummies		Yes		Yes	
Adj. R^2		0.062		0.067	
Obs.		17,858		4,248	
		Coeff.	Prob. > *F*	Coeff.	Prob. > *F*
Response + Response × Neg. Transfer		-0.061**	(0.020)	-0.148***	(0.009)
Response + Response × Weak Transfer		-0.017	(0.696)	0.009	(0.877)

Notes: Table 7 reports the regression results of Model 3. All sequential variables are winsorized at 1% and 99% of the respective distributions. The *t*-statistics in parentheses are corrected for heteroscedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year levels, as proposed by Petersen (2009). ***, **, and * indicate the value is significantly different from 0 at the 1%, 5%, and 10% levels, respectively, using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

6. Additional Analysis

6.1. Overreactions to Information Transfers Where Firms Are Less Competitive

6.1.1. Overreactions Associated with Bellwether Firms' Earnings Announcements

In this section, I conduct additional analysis to validate the main conclusions of this study. To this end, I examine reactions to information transfers when the first and late announcers are less competitive. If the main conclusion is supported, there should be less overreaction to information transfers when firms are less competitive.

First, I examine overreactions to information transfers associated with bellwether firms' earnings announcements. Bellwether firms' earnings announcements are likely to convey more news about macroeconomic conditions (Anilowski et al. 2007; Bonsall et al. 2013; Barth and So 2014). That is, bellwether firms' earnings news tends to reflect market-wide news rather than competitive shifting news. Moreover, bellwether firms attract attention from peer firms' investors as a leading indicator of the market or industry (Hann et al. 2019). This implies that peer firms' investors do not regard bellwether firms as rivals who compete for market share. Therefore, I predict that bellwether firms' earnings announcements will cause positive transfers rather than negative transfers and that there will be smaller overreactions to information transfers. Following Anilowski et al. (2007) and Barth and So (2014), who define bellwether firms as large firms included in the S&P 500 index, for this study, I define bellwether firms as firms included in the Nikkei 500 index.[14] I develop the Nikkei 500 index dummy (*NIKKEI500*), which is equal to 1 if firms are included in the Nikkei 500 index and 0 otherwise, and estimate Model 2 by using *NIKKEI500* instead of *HHID*.

Table 8 summarizes the empirical results. When the first announcers are not bellwether firms (*NIKKEI500* = 0), the coefficient of *Response* is significantly negative. In contrast, when the first announcers are bellwether firms (*NIKKEI500* = 1), the coefficient of *Response* is insignificant. These results suggest that bellwether firms' earnings capture more industry-wide effects and are less affected by competition; hence, overreaction to their announcements is lower, which is consistent with the previous prediction. However, the interaction term of *Response* and *NIKKEI500* is insignificant, suggesting that the results in Table 8 are not robust.

6.1.2. The Effect of Industry Sales Growth on Overreactions to Information Transfers

In the second analysis, I examine the effect of industry sales growth on overreaction to information transfers. In a high-growth industry, firms can achieve increased sales without wresting market share away from industry peers because the entire market is also expanding. Therefore, firms will be less competitive in a high-growth industry and there will be fewer market overreactions to information transfers.

To investigate this issue, I developed a high-growth industry dummy (*Industry Growth*), which is equal to 1 if the growth ratio of industry sales (= [industry aggregate sales for year t – industry aggregate sales for year t-1]/industry aggregate sales for year t-1) is in the fourth quartile (large positive) and 0 otherwise. Then, I estimated Model 2 using *Industry Growth* instead of *HHID*.

The results are summarized in Table 9. In a low-growth industry subsample (*Industry Growth* = 0), the coefficient of *Response* is significantly negative at the 1% level. In contrast, in the high-growth industry subsample (*Industry Growth* = 1), the coefficient of *Response* is insignificant. From the pooled regression analysis using the interaction term of *Response* and *Industry Growth*, I find that the coefficient of *Response* × *Industry Growth* is significantly positive at the 1% level. The result of the F-test reveals that the sum of the coefficients of *Response* and *Response* × *Industry Growth* is significantly different from zero. These results suggest that market overreaction to information

[14] The Nikkei 500 is comprised of 500 stocks selected from Japanese common stocks in the first section of the Tokyo Stock Exchange (TSE). It excludes ETFs, REITs, preferred equity contribution securities, and tracking stocks other than common stocks. As a robustness check, I redefined "bellwether firms" as firms included in the Nikkei 225 index and obtained similar results.

TABLE 8. OVERREACTION TO INFORMATION TRANSFERS ASSOCIATED WITH BELLWETHER FIRMS' EARNINGS ANNOUNCEMENTS

		(1) Non-bellwether firms' earnings announcements (*NIKKEI500* = 0)		(2) Bellwether firms' earnings announcements (*NIKKEI500* = 1)		(3) Pooled sample	
	Pred. sign	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Intercept	?	0.026***	(3.471)	0.043***	(3.528)	0.024***	(3.358)
Response	–	-0.049**	(-2.234)	-0.037	(-0.571)	-0.048**	(-2.177)
Response × *NIKKEI500*	+					0.026	(1.323)
NIKKEI500	?					0.001	(0.479)
Peer's Ann. Return	+	0.002	(0.130)	0.031	(0.633)	0.009	(0.572)
Ann. Return$_{t-1}$	+	0.080***	(4.780)	0.023	(0.761)	0.080***	(4.647)
logMV	–	-0.000	(-0.133)	-0.004**	(-2.255)	-0.000	(-0.179)
logBM	+	0.003**	(2.315)	0.006**	(2.417)	0.003**	(2.539)
Return 1mo.	–	-0.001	(-0.330)	0.010	(0.572)	-0.001	(-0.276)
Return 6mo.	+	-0.019***	(-4.032)	-0.002	(-0.267)	-0.018***	(-3.921)
Ann. Lag	–	-0.002**	(-2.014)	-0.001	(-0.330)	-0.002*	(-1.880)
ROA	+	-0.041**	(-2.351)	-0.127***	(-2.969)	-0.044***	(-2.811)
ΔROA	+	0.069***	(4.075)	0.088	(1.560)	0.068***	(4.329)
Std. ROA	–	-0.037*	(-1.936)	0.005	(0.083)	-0.034*	(-1.830)
Std. Return	–	-0.015	(-0.657)	-0.051	(-1.612)	-0.019	(-0.798)
Std. Industry Return	–	0.012	(0.138)	0.384*	(1.784)	0.040	(0.549)
Cross Own.	?	0.005	(0.639)	0.021	(1.059)	0.006	(0.898)
Stable Own.	?	0.002	(0.648)	-0.011	(-1.127)	0.001	(0.371)
Year Dummies		Yes		Yes		Yes	
Industry Dummies		Yes		Yes		Yes	
Adj. R^2		0.059		0.099		0.061	
Obs.		19,610		1,697		22,106	
						Coeff.	Prob. > *F*
Response + *Response* × *NIKKEI500*						-0.022	(0.758)

Notes: Table 8 reports overreaction to information transfers associated with bellwether firms' earnings announcements. All sequential variables are winsorized at 1% and 99% of the respective distributions. Bellwether firms are defined as firms included in the Nikkei 500. The dependent variable is *Ann. Return*, which is the late announcer's three-day market-adjusted abnormal return around the late announcer's earnings announcement date in year *t*. The *t*-statistics in parentheses are corrected for heteroscedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year levels, as proposed by Petersen (2009). ***, **, and * indicate that the values are significantly different from 0 at the 1%, 5%, and 10% levels, respectively, using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

transfers is only observed in lower growth industries, which is consistent with the scenario that investors overreact to information transfers in a highly competitive environment.

TABLE 9. INDUSTRIAL GROWTH AND OVERREACTION TO INFORMATION TRANSFERS

		(1) Middle- and low-growth industry (*Industry Growth* = 0)		(2) High-growth industry (*Industry Growth* = 1)		(3) Pooled sample	
	Pred. sign	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Intercept	?	0.024**	(2.415)	0.027	(1.283)	0.024***	(3.465)
Response	–	-0.060***	(-3.518)	0.010	(0.307)	-0.060***	(-3.483)
Response × *Industry Growth*	+					0.066***	(2.642)
Industry Growth	?					0.000	(0.334)
Peer's Ann. Return	+	0.015	(0.864)	-0.007	(-0.236)	0.008	(0.528)
Ann. Return$_{t-1}$	+	0.087***	(4.442)	0.053**	(2.529)	0.080***	(4.643)
logMV	–	-0.000	(-0.102)	-0.001	(-0.308)	-0.000	(-0.168)
logBM	+	0.003**	(2.321)	0.001	(0.753)	0.003**	(2.510)
Return 1mo.	–	0.001	(0.216)	-0.008	(-0.822)	-0.001	(-0.255)
Return 6mo.	+	-0.018***	(-3.654)	-0.020***	(-4.368)	-0.018***	(-3.955)
Ann. Lag	–	-0.002**	(-2.226)	-0.001	(-0.507)	-0.002*	(-1.874)
ROA	+	-0.039*	(-1.928)	-0.078***	(-3.063)	-0.044***	(-2.772)
Δ ROA	+	0.063***	(3.940)	0.096***	(3.337)	0.068***	(4.331)
Std. ROA	–	-0.035*	(-1.781)	-0.010	(-0.219)	-0.033*	(-1.793)
Std. Return	–	-0.027	(-1.060)	0.010	(0.315)	-0.019	(-0.786)
Std. Industry Return	–	0.032	(0.648)	0.289	(1.412)	0.042	(0.605)
Cross Own.	?	0.008	(0.985)	-0.001	(-0.114)	0.006	(0.868)
Stable Own.	?	0.001	(0.259)	0.001	(0.198)	0.001	(0.355)
Year Dummies		Yes		Yes		Yes	
Industry Dummies		Yes		Yes		Yes	
Adj. R^2		0.064		0.063		0.061	
Obs.		17,437		4,669		22,106	
						Coeff.	Prob.>*F*
Response + *Response* × *Industry Growth*						0.006	(0.858)

Notes: Table 9 reports the effect of industry growth on overreaction to information transfers. All sequential variables are winsorized at 1% and 99% of the respective distributions. I adopt a high-growth industry dummy (*Industry Growth*) that is equal to 1 if the growth ratio of industry sales is in the fourth quartile and 0 otherwise. The dependent variable is *Ann. Return*, which is the late announcer's three-day market-adjusted abnormal return around the late announcer's earnings announcement date in year *t*. The *t*-statistics in parentheses are corrected for heteroscedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year levels, as proposed by Petersen (2009). ***, **, and * indicate that the values are significantly different from 0 at the 1%, 5%, and 10% levels, respectively, using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

6.2. Alternate Measure of Product Market Competition

In this subsection, I re-examine the main analysis using an alternative measure of product market competition. Karuna (2007) argues that industry concentration alone could be a poor proxy for competition due to endogeneity and suggests that competition should be measured using multidimensional variables. Thus, following Karuna (2007), I develop a composite measure of product market competition (*PMC*). First, I compute the three competition measures: 1) product substitutability (*DIFF*) (= industry aggregate sales/industry aggregate operating costs),[15] 2) market size (*MKTSIZE*) (= natural log of aggregate sales by industry), and 3) costs of entry (*ENTCOST*) (= natural log of the weighted average gross value of the cost of property, plant, and equipment for firms in the industry). Subsequently, I reduce the HHI and the three competition measures given above into a single index (*PMC)* using factor analysis.[16]

I develop the product market competition dummy (*PMCD*), which is equal to 1 if *PMC* is in the fourth quartile (i.e. a highly competitive environment) and 0 otherwise. Using *PMCD* instead of *HHID*, I re-estimate Models 2 and 3. If the result supports Hypothesis 1, then the coefficient of *Response* × *PMCD* in Model 2 should be significantly negative. If the result supports Hypothesis 2, then the coefficient of *Response* × *Neg. Transfer* in Model 3 should be significantly negative in the high-competition sample (*PMCD* = 1).

Table 10 presents the regression results for testing Hypothesis 1. In both subsamples, the coefficient of *Response* is significantly negative, but the magnitude of the coefficient is higher in the high-competition sample (*PMCD* = 1). Furthermore, I estimate Model 2 using *Response* × *PMCD* for the pooled sample. The coefficient of *Response* × *PMCD* was significantly negative. These results suggest that the market overreacts to the first peer's earnings announcement when firms face high product market competition.

Table 11 reports the regression results for testing Hypothesis 2. In the high-competition sample, the coefficient of *Response* × *Neg. Transfer* is significantly negative at the 5% level. The results of the *F*-test reveal that the sum of the coefficients of *Response* and *Response* × *Neg. Transfer* is statistically different from zero. On the other hand, both the coefficient of *Response* and the coefficient of *Response* × *Weak Transfer* are insignificant. These results suggest that in highly competitive industries, only negative transfers drive market overreactions to information transfers. Thus, the main results are robust when using an alternate proxy for competition.

6.3. Other Robustness Checks

I conducted further robustness checks. First, I examined the possibility that HHI does not capture product market competition, but instead captures stock return volatility. To this end, I re-estimate Model 2, which includes the interaction term of *Response* and *HHI* after controlling for the interaction term of *Response* and *Std. Return* or *Response* and *Std. Industry Return* or both. As defined earlier, *Std. Return* is the stock return volatility and *Std. Industry Return* is the industry stock return volatility over the past 12 months. Table 12 summarizes the results of the regression analysis. In each column, the coefficient of *Response* × *HHID* remained significantly negative after controlling for *Response* × *Std. Return*, *Response* × *Std. Industry Return* or both. These results suggest that HHI does not only capture stock return volatility.

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[15] Operating costs include the cost of goods sold, general and administrative expenses, depreciation, depletion, and amortization.

[16] The untabulated result shows that a single factor loaded by four competition measures (*HHI*, *DIFF*, *MKTSIZE*, and *ENTCOST*) justifies about 40% of the cumulative variance. Furthermore, principal component 1 has positive signs, as expected. Thus, I conclude that the factor analysis provides useful composite measures to capture the extent of product market competition.

TABLE 10. TESTING HYPOTHESIS 1 USING AN ALTERNATIVE PRODUCT MARKET COMPETITION MEASURE

		(1) Low-competition sample (*PMCD* = 0)		(2) High-competition sample (*PMCD* = 1)		(3) Pooled sample	
	Pred. sign	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Intercept	?	0.024***	(2.860)	0.057***	(4.907)	0.024***	(3.415)
Response	–	-0.040**	(-2.115)	-0.079**	(-2.019)	-0.039**	(-2.188)
Response × *PMCD*	–					-0.043**	(-2.069)
PMCD	?					0.001	(0.148)
Peer's Ann. Return	+	0.011	(0.585)	0.011	(0.826)	0.009	(0.586)
Ann. Return$_{t-1}$	+	0.081***	(4.591)	0.074***	(3.502)	0.080***	(4.675)
logMV	–	-0.000	(-0.263)	0.001	(0.574)	-0.000	(-0.178)
logBM	+	0.003**	(2.221)	0.004	(1.570)	0.003**	(2.515)
Return 1mo.	–	-0.005	(-1.113)	0.024**	(2.386)	-0.001	(-0.281)
Return 6mo.	+	-0.017***	(-3.818)	-0.026***	(-3.657)	-0.018***	(-3.922)
Ann. Lag	–	-0.002*	(-1.811)	-0.002	(-1.150)	-0.002*	(-1.857)
ROA	+	-0.055***	(-3.096)	0.005	(0.125)	-0.044***	(-2.802)
Δ ROA	+	0.070***	(4.176)	0.062**	(2.059)	0.068***	(4.329)
Std. ROA	–	-0.050**	(-2.776)	0.031	(0.660)	-0.033*	(-1.832)
Std. Return	–	-0.021	(-0.910)	-0.014	(-0.404)	-0.019	(-0.797)
Std. Industry Return	–	0.057	(0.730)	-0.437**	(-2.060)	0.043	(0.592)
Cross Own.	?	0.008	(1.212)	-0.002	(-0.125)	0.006	(0.891)
Stable Own.	?	0.004	(1.156)	-0.010	(-1.980)	0.001	(0.375)
Year Dummies		Yes		Yes		Yes	
Industry Dummies		Yes		Yes		Yes	
Adj. R^2		0.060		0.081		0.061	
Obs.		17,213		4,893		22,106	

Notes: Table 10 reports the regression results of Model 2 using an alternative product market competition measure. All sequential variables are winsorized at 1% and 99% of the respective distributions. The *t*-statistics in parentheses are corrected for heteroscedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year levels, as proposed by Petersen (2009). ***, **, and * indicate the value is significantly different from 0 at the 1%, 5%, and 10% levels, respectively, using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

Second, I examine whether investors' reactions to good news differ from their reactions to bad news. I define a dummy variable (*Bad News*), equal to 1 if the first announcer reports bad news (i.e. *Peer's Ann. Return* is negative) and 0 otherwise (i.e. *Peer's Ann. Return* is positive). Then, I re-estimate Model 2, which includes the interaction term of *Response* and *Bad News*. If investors' reactions to the first announcer's negative news differ from the reactions to positive news, the coefficient of *Response* × *Bad News* should be statistically significant. The results, which are not tabulated, show that the coefficient of *Response* × *Bad News* is positive (0.036) but not significant

TABLE 11. TESTING HYPOTHESIS 2 USING AN ALTERNATIVE PRODUCT MARKET COMPETITION MEASURE

		(1) Low-competition sample (*PMCD* = 0)		(2) High-competition sample (*PMCD* = 1)	
	Pred. sign	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Intercept	?	0.024***	(3.113)	0.058***	(4.852)
Response	–	-0.027	(-1.235)	-0.007	(-0.112)
Response × *Neg. Transfer*	–	-0.034	(-0.961)	-0.174**	(-2.402)
Response × *Weak Transfer*	?	0.000	(0.003)	0.026	(0.299)
Neg. Transfer	?	0.001	(0.494)	-0.000	(-0.059)
Weak Transfer	?	-0.001	(-0.735)	-0.002	(-0.505)
Peer's Ann. Return	+	0.003	(0.163)	-0.002	(-0.119)
Ann. Return$_{t-1}$	+	0.081***	(4.605)	0.074***	(3.539)
logMV	–	-0.000	(-0.236)	0.001	(0.630)
logBM	+	0.003**	(2.247)	0.004	(1.530)
Return 1mo.	–	-0.006	(-1.168)	0.023**	(2.372)
Return 6mo.	+	-0.018***	(-3.825)	-0.026***	(-3.739)
Ann. Lag	–	-0.002*	(-1.793)	-0.003	(-1.146)
ROA	+	-0.055***	(-3.074)	0.008	(0.203)
Δ ROA	+	0.070***	(4.190)	0.064**	(2.155)
Std. ROA	–	-0.050***	(-2.812)	0.026	(0.555)
Std. Return	–	-0.022	(-0.953)	-0.020	(-0.602)
Std. Industry Return	–	0.060	(0.766)	-0.443**	(-2.228)
Cross Own.	?	0.008	(1.228)	-0.002	(-0.137)
Stable Own.	?	0.004	(1.158)	-0.010*	(-1.922)
Year Dummies		Yes		Yes	
Industry Dummies		Yes		Yes	
Adj. R^2		0.060		0.084	
Obs.		17,213		4,893	
		Coeff.	Prob. > *F*	Coeff.	Prob. > *F*
Response + *Response* × *Neg. Transfer*		-0.061**	(0.025)	-0.181***	(0.002)
Response + *Response* × *Weak Transfer*		-0.027	(0.572)	0.019	(0.771)

Notes: Table 11 reports the regression results of Model 3. All sequential variables are winsorized at 1% and 99% of the respective distributions. The *t*-statistics in parentheses are corrected for heteroscedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year levels, as proposed by Petersen (2009). ***, **, and * indicate the value is significantly different from 0 at the 1%, 5%, and 10% levels, respectively, using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

(t = 1.514), suggesting that investor reactions to positive and negative news do not differ. Therefore, I conclude that the sign of the first announcer's news does not affect the results of this study.

Third, I investigate the effect of the first and late announcers' earnings announcements on overreaction to information transfers. When the late announcer's earnings announcement date is

TABLE 12. EFFECT OF PRODUCT MARKET COMPETITION ON OVERREACTION CONTROLLING FOR UNCERTAINTY

		(1)		(2)		(3)	
	Pred. sign	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Intercept	?	0.024***	(3.385)	0.024***	(3.446)	0.024***	(3.428)
Response	−	-0.053**	(-2.575)	-0.096*	(-1.904)	-0.099*	(-1.879)
Response × *HHID*	−	-0.053**	(-2.062)	-0.050**	(-2.005)	-0.052**	(-2.093)
HHID	?	0.003	(0.386)	0.003	(0.397)	0.003	(0.395)
Response × *Std. Return*	−	0.145	(0.790)			0.071	(0.431)
Response × *Std. Industry Return*	−			1.044	(1.266)	0.949	(1.290)
Peer's Ann. Return	+	0.008	(0.584)	0.008	(0.558)	0.008	(0.559)
Ann. Return$_{t-1}$	+	0.081***	(4.669)	0.080***	(4.697)	0.081***	(4.685)
logMV	−	-0.000	(-0.187)	-0.000	(-0.183)	-0.000	(-0.182)
logBM	+	0.003**	(2.521)	0.003**	(2.489)	0.003**	(2.507)
Return 1mo.	−	-0.001	(-0.269)	-0.001	(-0.296)	-0.001	(-0.288)
Return 6mo.	+	-0.019***	(-3.893)	-0.019***	(-3.906)	-0.019***	(-3.895)
Ann. Lag	−	-0.002*	(-1.838)	-0.002*	(-1.838)	-0.002*	(-1.839)
ROA	+	-0.044***	(-2.781)	-0.044***	(-2.799)	-0.044***	(-2.788)
Δ ROA	+	0.068***	(4.321)	0.068***	(4.356)	0.068***	(4.350)
Std. ROA	−	-0.033*	(-1.814)	-0.033*	(-1.826)	-0.033*	(-1.825)
Std. Return	−	-0.019	(-0.786)	-0.019	(-0.804)	-0.019	(-0.801)
Std. Industry Return	−	0.041	(0.570)	0.037	(0.525)	0.037	(0.520)
Cross Own.	?	0.006	(0.905)	0.006	(0.911)	0.006	(0.912)
Stable Own.	?	0.001	(0.392)	0.001	(0.381)	0.001	(0.388)
Year Dummies		Yes		Yes		Yes	
Industry Dummies		Yes		Yes		Yes	
Adj. R^2		0.061		0.061		0.061	
Obs.		22,106		22,106		22,106	

Notes: Table 12 reports the regression results of Models 2 and 3 controlling for uncertainty. All sequential variables are winsorized at 1% and 99% of the respective distributions. The *t*-statistics in parentheses are corrected for heteroscedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year levels, as proposed by Petersen (2009). ***, **, and * indicate the value is significantly different from 0 at the 1%, 5%, and 10% levels, respectively, using a two-tailed *t*-test. Please see the definition of variables in the Appendix.

sufficiently distant from the first announcer's date, the late announcer's overreaction can be expected to be adjusted by other firms' announcements during the period. Thus, I include the interaction term of *Response* and *Ann.Lag* (*Response* × *Ann.Lag*) in the model (2). *Response* and *Ann.Lag* are defined in Section 3.2.1. Supposing that the timing of the late announcer's earnings announcement is related to the magnitude of the overreaction to information transfers, the coefficient of *Response* × *Ann.Lag* will be statistically significant. The untabulated result shows that the coefficient of *Response* × *Ann.Lag* is positive (0.024) and statistically insignificant (t = 1.133). Meanwhile, the coefficient of *Response* × *HHID* is negative (-0.053) and remains significant (t = -2.006). These results imply that the time lag between the first and late announcers' earnings announcements is not related to the overreaction to information transfers.

The final robustness check uses a sample that includes late announcers whose earnings announcement dates are not five days apart from the first announcer's earnings announcement date. The number of observations increased from 22,106 to 23,179. The results, which are not tabulated, from the re-estimated Model 2 using all late announcers show that the coefficient of *Response* (-0.072) is significantly negative (t = -2.079) only when product market competition is high (*HHID* = 1). Additionally, in Model 2, with the interaction term of *Response* and *HHID*, the coefficient of *Response* × *HHID* remains negative (-0.056) and significant (t = -1.988). The regression results of Model 3 reveal that the coefficient of *Response* × *Neg. Transfer* (-0.161) is significantly negative. These results are consistent with Hypotheses 1 and 2.

7. Summary and Conclusion

This study hypothesizes and finds that overreactions to a first announcer's earnings announcement are more pronounced when firms face high product market competition. In addition, I find that overreactions in competitive environments are driven by negative transfers and not by positive transfers. The results imply that investors do not fully understand the differential persistence between industry-wide and firm-specific news released by the industry, which is consistent with the functional fixation hypothesis. Furthermore, additional analyses reveal that overreactions to information transfers are observed less when firms are less competitive. Specifically, when the announcement firms are bellwether firms or firms in industries with high sales growth, an overreaction is not observed. The results are robust when I use an alternative measure of product market competition. The findings make academic and practical contributions, showing that product market competition can lead to stock market mispricing in the context of information transfers.

This study had some limitations for future research. First, I did not control for the effects of simultaneous events. Some studies have found that other events, including share repurchase announcements (Hertzel 1991; Erwin and Miller 1998; Massa et al. 2007), merger and acquisition announcements (Eckbo 1983; Stillman 1983; Akhigbe and Madura 1999), stock split announcements (Slovin et al. 1995; Tawatnuntachai and D'Mello 2002), and equity offering announcements (Szewczyk 1992), cause information transfers. If these events occur concurrently with earnings announcements, they can affect the results of this study. Second, although this study focuses on the Japanese stock market, future research could examine whether the findings of this study can be generalized to other countries' stock markets.

REFERENCES

Abegglen, J. C., and G. Stalk. 1985. *Kaisha, the Japanese Corporation.* New York: Basic Books.

Akhigbe, A., and J. Madura. 1999. The industry effects regarding the probability of takeovers. *Financial Review* 34 (3): 1–17.

Ali, A., J. Ronen, and S. H. Li. 1994. Discretionary disclosures in response to intra-industry information transfers. *Journal of Accounting, Auditing and Finance* 9 (2): 265–282.

Anilowski, C., M. Feng, and D. J. Skinner. 2007. Does earnings guidance affect market returns? The nature and information content of aggregate earnings guidance. *Journal of Accounting and Economics* 44 (1): 36–63.

Aoki, M., and H. Patrick. 1995. *The Japanese Main Bank System: Its Relevance for Developing and Transforming Economies*. Oxford University Press.

Asaba, S. 2002. *Nihon Kigyo no Kyoso Genri: Doshitsuteki Kodo no Jissho Bunseki* (Competitive Principles of Japanese Firms: Empirical Analyses on Similar Behavior). Toyo Keizai Shinpo-sha (in Japanese).

Ayers, B., and R. N. Freeman. 1997. Market assessment of industry and firm earnings information. *Journal of Accounting and Economics* 24 (2): 205–218.

Baginski, S. P. 1987. Intraindustry information transfers associated with management forecasts of earnings. *Journal of Accounting Research* 25 (2): 196–216.

Barth, M. E., and E. C. So. 2014. Non-diversifiable volatility risk and risk premiums at earnings announcements. *The Accounting Review* 89 (5): 1579–1607.

Bloomfield, R., R. Libby, and M. W. Nelson. 2000. Underreactions, overreactions and moderated confidence. *Journal of Financial Markets* 3 (2): 113–137.

Bonsall, S. B., Z. Bozanic, and P. E. Fischer. 2013. What do management earnings forecasts convey about the macroeconomy? *Journal of Accounting Research* 51 (2): 225–266.

Brochet, F., K. Kolev, and A. Lerman. 2018. Information transfer and conference calls. *Review of Accounting Studies* 23 (3): 907–957.

Chan, L. K. C., N. Jegadeesh, and J. Lakonishok. 1996. Momentum strategies. *The Journal of Finance* 51 (5): 1681–1713.

Cheng, C. S. A., and J. D. Eshleman. 2014. Does the market overweight imprecise information? Evidence from customer earnings announcements. *Review of Accounting Studies* 19 (3): 1125–1151.

Cooper, R. 1995. *When Lean Enterprises Collide.* Boston, MA: Harvard Business School Press.

Docking, D. S., M. Hirschey, and E. Jones. 1997. Information and contagion effects of bank loan-loss reserve announcements. *Journal of Financial Economics* 43 (2): 219–239.

Douthett, Jr, E. B., and K. Jung. 2001. Japanese corporate groupings (keiretsu) and the informativeness of earnings. *Journal of International Financial Management and Accounting* 12 (2): 133–159.

Easton, P., G. Gao, and P. Gao. 2010. *Pre-earnings announcement drift.* Available at : http://ssrn.com/abstract=1786697.

Eckbo, B. E. 1983. Horizontal mergers, collusion, and stockholder wealth. *Journal of Financial Economics* 11 (1-4): 241–273.

Elgers, P. T., S. L. Porter, and L. U. Emily Xu. 2008. The timing of industry and firm earnings information in security prices: A re-evaluation. *Journal of Accounting and Economics* 45 (1): 78–93.

Erwin, G. R., and J. M. Miller. 1998. The intra-industry effects of open market share repurchases: Contagion or competitive? *The Journal of Financial Research* 21 (4): 389–406.

Fama, E. F., and K. R. French. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33 (1): 3–56.

Fan, J. P., and T. J. Wong. 2002. Corporate ownership structure and the informativeness of accounting earnings in East Asia. *Journal of Accounting and Economics* 33 (3): 401–425.

Firth, M. 1976. The impact of earnings announcements on the share price behaviour of similar type firms. *The Economic Journal* 86 (342): 296–306.

Foster, G. 1981. Intra-industry information transfers associated with earnings releases. *Journal of Accounting and Economics* 3 (3): 201–232.

Freeman, R., and S. Tse. 1992. An earnings prediction approach to examining intercompany information transfers. *Journal of Accounting and Economics* 15 (4): 509–523.

Givoly, D., and D. Palmon. 1982. Timeliness of annual earnings announcements: Some empirical evidence. *The Accounting Review* 57 (3): 486–508.

Gleason, C. A., N. T. Jenkins, and W. B. Johnson. 2008. The contagion effects of accounting restatements. *The Accounting Review* 83 (1): 83–110.

Griffin, D., and A. Tversky. 1992. The weighing of evidence and the determinants of confidence. *Cognitive Psychology* 24 (3): 411–435.

Hann, R. N., H. Kim, and Y. Zheng. 2019. Intra-industry information transfers: Evidence from changes in implied volatility around earnings announcements. *Review of Accounting Studies* 24 (3): 927–971.

Hertzel, M. G. 1991. The effects of stock repurchases on rival firms. *The Journal of Finance* 46 (2): 707–716.

Hoshi, T., A. Kashyap, and D. Scharfstein. 1990. The role of banks in reducing the costs of financial distress in Japan. *Journal of Financial Economics* 27 (1): 67–88.

Hui, K. W., K. K. Nelson, P. E. Yeung. 2016. On the persistence and pricing of industry-wide and firm-specific earnings, cash flows, and accruals. *Journal of Accounting and Economics* 61 (1): 185–202.

Hui, K. W., and P. E. Yeung. 2013. Underreaction to industry-wide earnings and the post-forecast revision drift. *Journal of Accounting Research* 51 (4): 701–737.

Iwasaki, T., N. Kitagawa, and A. Shuto. 2014. The effect of product market competition on discretionary management forecasts. Proceedings In 2015 Midyear Meeting of the International Accounting Section of the American Accounting Association.

Jegadeesh, N. 1990. Evidence of predictable behavior of security returns. *The Journal of Finance* 45 (3): 881–898.

Jegadeesh, N., and S. Titman. 1993. Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance* 48 (1): 65–91.

Jiang, G., C. M. C. Lee, and Y. Zhang. 2005. Information uncertainty and expected returns. *Review of Accounting Studies* 10 (2): 185–221.

Karuna, C. 2007. Industry product market competition and managerial incentives. *Journal of Accounting and Economics* 43 (2-3): 275–297.

Kim, Y., M. Lacina, and M. S. Park. 2008. Positive and negative information transfers from management forecasts. *Journal of Accounting Research* 46 (4): 885–908.

Kitagawa, N. 2014. Accounting information transfers and market efficiency. *Journal of Economics and Business Administration* 210 (6): 59–74 (in Japanese).

Koo, D. S., J. J. Wu, and P. E. Yeung. 2017. Earnings attribution and information transfers. *Contemporary Accounting Research* 34 (3): 1547–1579.

Lang, M., and R. Lundholm. 1996. The relation between security returns, firm earnings, and industry earnings. *Contemporary Accounting Research* 13 (2): 607–629.

Lang, L. H. P., and R. Stulz. 1992. Contagion and competitive intra-industry effects of bankruptcy announcements. *Journal of Financial Economics* 32 (1): 45–60.

Li, X. 2010. The impacts of product market competition on the quantity and quality of voluntary disclosures. *Review of Accounting Studies* 15 (3): 663–711.

Markarian, G., and J. Santalo. 2014. Product market competition, information and earnings management. *Journal of Business Finance and Accounting* 41 (5-6): 572–599.

Massa, M., Z. Rehman, and T. Vermaelen. 2007. Mimicking repurchases. *Journal of Financial Economics* 84 (3): 624–666.

Okumura, M. 2013. Contagion effects of earnings restatements and reliability of accounting information. *Contemporary Disclosure Research* 13: 137–151 (in Japanese).

Otogawa, K., and H. Yamaji. 2006. Corporate groups and stock pricing in Japan: Information transfer effects of earnings forecast revision. *Kobe Economic and Business Review* 51: 11–31.

Pandit, S., C. E. Wasley, and T. Zach. 2011. Information externalities along the supply chain: The economic determinants of suppliers' stock price reaction to their customers' earnings announcements. *Contemporary Accounting Research* 28 (4): 1304–1343.

Petersen, M. A. 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies* 22 (1): 435–480.

Ramalingegowda, S., T. Shu, and E. Yeung. 2012. *Moderated confidence and under- and overreactions to related firms' news.* Available at : http://ssrn.com/abstract=1785340.

Ramnath, S. 2002. Investor and analyst reactions to earnings announcements of related firms: An empirical analysis. *Journal of Accounting Research* 40 (5): 1351–1376.

Schipper, K. 1990. Information transfers. *Accounting Horizons* 4 (4): 97–107.

Shuto, A., and T. Iwasaki. 2014. Stable shareholdings, the decision horizon problem and earnings smoothing. *Journal of Business Finance and Accounting* 41 (9-10): 1212–1242.

Shuto, A., and N. Kitagawa. 2011. The effect of managerial ownership on the cost of debt: Evidence from Japan. *Journal of Accounting, Auditing and Finance* 26 (3): 590–620.

Sloan, R. G. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review* 71 (3): 289–316.

Slovin, M. B., M. E. Sushka, and S. R. Ferraro. 1995. A comparison of the information conveyed by equity carve-outs, spin-offs, and asset sell-offs. *Journal of Financial Economics* 37 (1): 89–104.

Stillman, R. 1983. Examining antitrust policy towards horizontal mergers. *Journal of Financial Economics* 11 (1-4): 225–240.

Szewczyk, S. H. 1992. The intra-industry transfer of information inferred from announcements of corporate security offerings. *The Journal of Finance* 47 (5): 1935–1945.

Tawatnuntachai, O., and R. D'Mello. 2002. Intra-industry reactions to stock split announcements. *Journal of Financial Research* 25 (1): 39–57.

Thomas, J., and F. Zhang. 2008. Overreaction to intra-industry information transfers? *Journal of Accounting Research* 46 (4): 909–940.

Tirole, J. 1988. *The Theory of Industrial Organization.* Cambridge: The MIT Press.

Tversky, A., and D. Kahneman. 1974. Judgment under uncertainty: Heuristics and biases. *Science* 185 (4157): 1124–1131.

Wang, C. 2014. Accounting standards harmonization and financial statement comparability: Evidence from transnational information transfer. *Journal of Accounting Research* 52 (4): 955–992.

Waring, G. 1996. Industry differences in the persistence of firm-specific returns. *The American Economic Review* 86 (5): 1253–1265.

Zhang, X. F. 2006. Information uncertainty and stock returns. *The Journal of Finance* 61 (1): 105–137.

APPENDIX: DEFINITIONS OF VARIABLES

Variables		Definitions
Ann. Return	=	Late announcer's three-day market-adjusted abnormal return around the late announcer's earnings announcement date in year *t*. Market-adjusted abnormal return is calculated as raw return minus value-weighted return excluding financial institutions. Value-weighted market return is calculated based on the market value of the equity of all the listed firms except for financial institutions, preferred securities, Japanese real estate investment trusts (J-REITs), and special investment corporations. The market values of equity are calculated based on the stock price at the end of the previous operating day. The three-day window is centered on the late announcer's earnings announcement date for year *t* ([-1, +1]).
Response	=	Late announcer's three-day market-adjusted abnormal return around the first announcer's earnings announcement date in year *t*. Market-adjusted abnormal return is calculated in the same way as for *Ann. Return*. The three-day window is centered on the first announcer's earnings announcement date in the industry for year *t* ([-1, +1]).
Peer's Ann. Return	=	First announcer's three-day market-adjusted abnormal return around the first announcer's earnings announcement date in year *t*. Market-adjusted abnormal return is calculated in the same way as for *Ann. Return*. The three-day window is centered on the first announcer's earnings announcement date in the industry for year *t* ([-1, +1]). If there are multiple first announcers for the industry in year *t*, *Peer's Ann. Return* is calculated as an arithmetic mean of their *Peer's Ann. Return*.
Ann. Return$_{t-1}$	=	Late announcer's three-day market-adjusted abnormal return around the late announcer's earnings announcement date in year *t*-1. Market-adjusted abnormal return is calculated in the same way as for *Ann. Return*. The three-day window is centered on the late announcer's earnings announcement date for year *t*-1 ([-1, +1]).
Return 1mo.	=	One-month buy-and-hold stock return ending one week before the late announcer's earnings announcement date in year *t*.
Return 6mo.	=	Six-month buy-and-hold stock return ending one week before the late announcer's earnings announcement date in year *t*.
logMV	=	The late announcer's natural logarithm of the market value of equity in year *t*. Market value of equity equals the closing price times the shares outstanding at the end of the fiscal year *t*.
logBM	=	The late announcer's natural logarithm of book-to-market ratio in year *t*. Book-to-market ratio is defined as net assets divided by market value of equity at the end of the fiscal year *t*.

Ann. Lag	=	The natural log of the difference between the first and late announcers' earnings announcement dates in year *t*.
ROA	=	Late announcers' ROA in year *t*. ROA is calculated as net income for year *t* divided by total assets at the end of year *t*-1.
ΔROA	=	Late announcers' change in ROA in year *t*.
Std. ROA	=	The ROA volatility of late announcers measured over the past five years.
Std. Return	=	The stock return volatility of late announcers measured over the past 12 months.
Std. Industry Return	=	The industry stock return volatility of late announcers measured over the past 12 months.
Cross Own.	=	The fraction of late announcers' cross-shareholdings among the related firms at the end of year *t*. Cross-shareholders include cross-shareholding domestic companies listed on the Japanese stock markets at the end of year *t*.
Stable Own.	=	The fraction of late announcers' stable shareholdings at the end of year *t*. Stable shareholders include financial institutions, trust banks, and other financial institutions (e.g. brokerage companies and securities financing companies). They also include parent companies and exclude domestic companies that are defined as cross-shareholders.
HHID	=	The dummy variable, which is equal to 1 if *HHI* is in the fourth quartile (this quartile contains the firms with the highest *HHI* in each year) and 0 otherwise. *HHI* is defined as the sales-based HHI times minus one.
Neg. Transfer	=	The dummy variable, which is equal to 1 if *Response*×*Peer*'s *Ann. Return* is in the first quartile (this quartile contains the firms with large negative information transfers) and 0 otherwise.
Weak Transfer	=	The dummy variable, which is equal to 1 if *Response*×*Peer*'s *Ann. Return* is in the second or third quartiles and 0 otherwise.
NIKKEI500	=	The dummy variable, which is equal to 1 if firms are included in the Nikkei 500 index and 0 otherwise.
Industry Growth	=	The dummy variable, which is equal to 1 if the growth ratio of industry sales is in the fourth quartile and 0 otherwise.
PMCD	=	The dummy variable, which is equal to 1 if *PMC* is in the fourth quartile and 0 otherwise. *PMC* is the competition measure for year *t* using factor analysis based on *HHI*, product substitutability (*DIFF*), market size (*MKTSIZE*), and entry cost (*ENTCOST*).