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盈餘品質與資訊移轉

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摘要：本研究探討同產業中第一家宣告季盈餘的公司，其盈餘品質是否影響該盈餘內涵的資訊在同產業移轉的大小；過去的文獻指出，好的盈餘品質更可有效反應一家公司的經營成果，本文進一步探討，是否好的盈餘品質的公司，所宣告的季盈餘，可以幫助市場投資人更有效評估同產業其他公司的營運狀況，該盈餘所內涵的資訊在同產業移轉程度較大。本文結果發現，當使用市場基礎的方法：盈餘反應係數（ERC）和價值相關性（value-relevance）來衡量盈餘品質時，第一家宣告季盈餘的公司，其較高的盈餘品質會使該盈餘所內涵的資訊在同產業移轉程度較大。但若以應計基礎的方法：異常裁決性應計數（abnormal discretionary accruals）和應計數品質（accrual quality）來衡量盈餘品質時，則沒有效果，本文建議，投資人解讀市場基礎的盈餘品質衡量方法和應計基礎的盈餘品質有所不同。

關鍵詞：資訊移轉、盈餘品質、盈餘宣告

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Earnings Quality and Information Transfers

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Abstract: This study examines whether the earnings quality of a firm that first announces quarterly earnings in its industry affects the magnitude of intra-industry information transfers. Prior research indicates that higher quality earnings present a better reflection of the operating fundamentals of a firm. In this paper, I argue that because earnings of high quality contain better information about a firm's performance, they are more helpful to investors when investors value non-announcing firms (firms which make earnings announcements after the first announcer)in the same industry, which results in greater information transfer. The results are consistent with my hypothesis in cases where earnings quality is captured using market-based measures (ERC and value-relevance); however, they are inconsistent with our hypothesis in cases where it is captured using accrual-based measures (abnormal discretionary accruals and accrual quality). This conclusion is consistent with the notion that investors differ in their incorporation of market-based and accrual-based earnings quality in earnings expectations.

Keywords: information transfer, earnings quality, earnings announcement

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I. Introduction

The purpose of this study is to investigate the association between earnings quality of announcing firms and the magnitude of information transfers surrounding quarterly earnings announcements. Existing evidences indicate that information transfer takes place from announcing to non-announcing firms in the same industry, triggering changes in the non-announcing firms' stock prices upon announcing firm's earnings announcement. As a result, I identify the earnings announcements of industry peer firms as a source of information for a firm and use measures of the earnings quality of the announcing firm to evaluate the merit of this information source. Prior studies, such as Baginski (1987), Foster (1981), Frost (1995), etc. have documented the existence of information transfers; another stream of literature has documented how the earnings quality of a firm affects stock revaluation within that firm. I extend the work in these two fields by investigating whether earnings quality of an announcing firm also affects the stock revaluation (which is used to measure the magnitude of information transfers) of non-announcing firms within the same industry.

To explore the association between the magnitude of information transfers and some, but by no means all, dimensional measures of earnings quality, I employ four measures of earnings quality. Similar to the work of Frankel and Li (2004), I refer to a firm's earnings response coefficient (ERC) and a value-relevance measure as "market-based" earnings quality, and abnormal accruals, estimated from the modified Jones model (Dechow, Sloan, and Sweeney, 1995), and accrual quality, estimated from the Dechow and Dichev (2002) model, as "accrual-based" earnings quality. Market-based measures take stock returns and prices into consideration and are derived from the association between returns and accounting earnings while accrual-based measures are based on accruals and earnings only and are derived from the accruals generating and allocating processes.

My findings illustrate that after the amount of earnings information is controlled, the magnitude of information transfers is larger when an announcing firm has higher earnings quality as captured by the market-based measures. However, the association between the announcers' earnings quality and the magnitude of information transfers is not significant when the accrual-based measures are used. One possible explanation for this is that investors incorporate market-based earnings quality and accrual-based earnings quality into earnings expectations differentially. Specifically, for a firm that historically has higher unsigned abnormal accruals or poor mapping from its accruals to operating cash

flows, its historical accrual pattern has already been taken into consideration, when the market or the analysts form their expectation of the reported earnings. In other words, observing a dollar earnings surprise from a firm with high unsigned abnormal accruals (or low accrual quality) is equivalent to observing a dollar earnings surprise from a firm with low unsigned abnormal accruals (or high accrual quality). Therefore, it is not surprising that there is no significant association between announcers' earnings quality and the magnitude of information transfers when the accrual-based measures are used. Such an explanation hinges on the fact that the accrual-based earnings quality measures are constructed over a long period of time, which allows the market to learn the accrual pattern of a firm and adjust its expectation accordingly. In contrast, market-based measures are derived based on the relationship between stock returns and accounting earnings. In essence, stock returns reflect the market's adjustment of its perception of all the value-relevant information of one firm in a particular period, and clearly this adjustment is done based upon a prior expectation that has already taken a firm's accrual pattern into consideration. When the investors historically respond more to a firm's reported earnings or the earnings numbers are historically more closely associated with stock returns, it is reasonable to expect a greater information content of this firm's concurrent earnings announcement, and in turn, a greater information transfer to other non-announcing firms in the same industry. This argument is supported by some of my empirical tests, in which the announcing firm's two-day cumulated abnormal returns are regressed on its unexpected earnings and an interaction term between the unexpected earnings and its earnings quality measure for the four earnings quality measures respectively. The results show that the historical abnormal accruals and accrual quality do not incrementally affect the market reaction to the unexpected earnings, but the historical market-based measures do. Given the fact that historical accrual-based earnings quality does not induce different market reaction to earnings surprises, it is not surprising that accrual-based earnings quality does not play a role in information transfers either. However, I am not able to rule out alternative explanations.

This study contributes to the existing literature in the following ways. First, very little research has examined the determinants of the magnitude of information transfers, except for industry homogeneity and industry concentration (Frost, 1995; Ninon, 1999) and firm size (Han and Wild, 2000; Asthana and Mishra, 2001). In her commentary on information transfers research, Schipper (1990) calls for more attention to explain how such transfers operate, and my study follows this suggestion by identifying earnings quality as an important determinant. Second, the literature on a firm's information environment usually focuses on the information from a firm's own financial reporting,

insiders, analysts, institutional investors, and news (Frankel and Li, 2004; Piotroski and Roulstone, 2004). The importance of intra-industry information transfers is evident from studies of momentum (Moskowitz and Grinblatt, 1999) and post-earnings announcement drift (Kovacs, 2007). Information transfers may be thought of as another information source and help to enrich a firm's information environment. This study is designed to analyze the merit of this information source. Third, Shipper (1990) raises a question of whether the evidence regarding the existence of information transfers has implications for the quality of our accounting system. Although there is no strong indication that our current accounting system encourages information transfers or that information transfers are truly considered when the accounting system is being formed, information transfers do take place. When earnings quality of a firm is considered, the association between earnings quality and information transfers may suggest potential externality benefits that high earnings quality of a firm helps improve the information environment of other firms in the same industry. This study suggests a side effect of high earnings quality to accounting policymakers and thus, extends information transfers research by finding the linkage between policy-based motivations and the existence of information transfers. In addition, the usefulness and the quality of earnings and financial statements have drawn much attention in recent accounting research, especially around the wave of accounting scandals of the early 2000s. Much effort has been put into investigating benefits of high earnings quality and developing appropriate measures of earnings quality. This study provides additional insight into various dimensional measures of earnings quality. I show that the market-based and accrual-based earnings quality measures are different in terms of capturing the effect of earnings quality on information transfers.

The remainder of the paper is organized as follows. Section 2 provides a literature review and develops the hypothesis; Section 3 describes the measures of earnings quality and the research design; Section 4 presents the sample selection and the results; and Section 5 concludes the paper.

II. Prior Research and Hypothesis Development

Since the pioneering work Ball and Brown (1968), it is commonly accepted that a firm's stock price change reflects investors' expectation update towards this firm based upon new information that arrived in the market. It is noted, however, firm-specific information is not the only source investors would rely upon to form their expectations. Conceivably, an information event announced by one firm could contemporaneously affect the market expectation of the value of one or a group of non-announcing firms.

This phenomenon is termed "information transfer," as defined in Schipper (1990).[1] Since firms in the same industry share common factors of the resource and the product markets that underlie firm value, an event announcement could be useful for evaluating non-announcing firms within the same industry as well.[2] Indeed, extant literature has confirmed that various events are able to deliver value relevant information not only about the announcing firms themselves, but also about the non-announcing firms within the same industry. These events include quarterly earnings announcements (Foster, 1981; Clinch and Sinclair, 1987; Freeman and Tse, 1992; Han and Wild, 2000; Asthana and Mishra, 2001; Ramnath, 2002), management forecasts announcements (Baginski, 1987; Han, Wild, and Ramesh, 1989; Pyo and Lustgarten, 1990), and earnings restatements (Xu, Najand, and Ziegenfuss, 2006; Gleason, Jenkins, and Johnson, 2008). The existence of information transfers is also broadly documented in the finance literature. For example, Lang and Stulz (1992) and Ferris, Jayaraman, and Makhija (1997) show that bankruptcy announcements affect stock prices of industry peers adversely, especially for peer firms that subsequently filed for bankruptcy within three years. Szewczyck (1992) suggests that investors infer unfavorable information regarding the prospects of the industry from announcements of common stock, convertible debt, and straight debt public offerings. Slovin, Sushka, and Bendeck (1991) find positive valuation effects for industry peers upon initial announcements of going-private bids. Caton, Goh, and Kohers (2003) indicate that the market infers unfavorable information regarding the industry from dividend-omission announcements, and the authors document both negative abnormal returns and negative abnormal analyst forecast revisions of industry peers upon announcements. Fee and Thomas (2004) and Shahrur (2005) find positive pricing effects on firms in the same industry as the merging firms upon the initial announcement of a horizontal takeover.

Figure 1 illustrates that the earnings surprise results in not only the price reaction of the announcing firm around the earnings announcement date but also the price reaction of non-announcing firms in the same industry, since the market perceives that elements of quarterly earnings of announcing firms are both firm-specific and industry-wide. While no prior study has examined the effect of earnings quality of announcing firms on the magnitude of information transfers, the association is expected to exist. Prior research has

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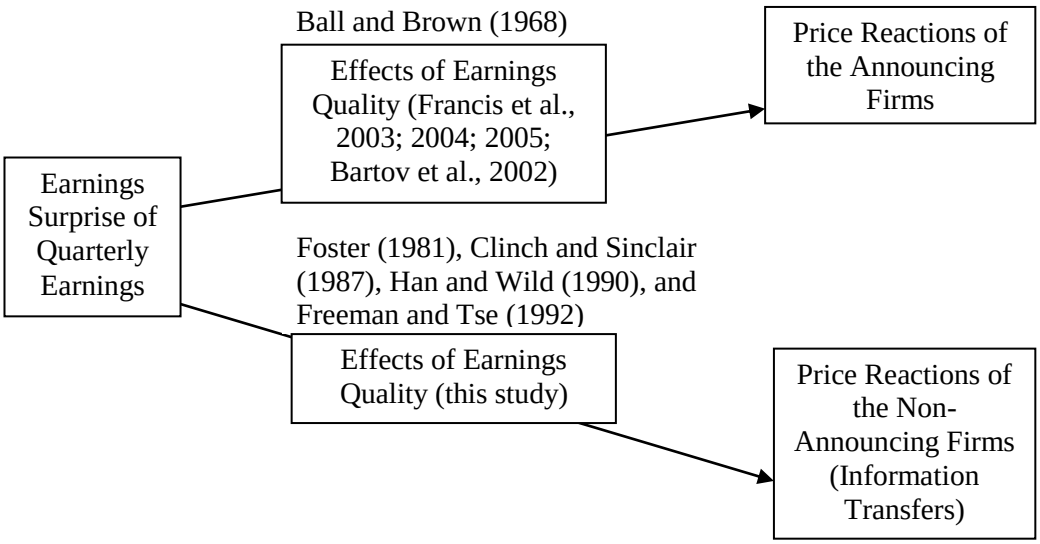
1 In the finance literature, the phenomenon of information transfers is sometimes alternatively termed "contagion effects" and "spillover effects", which indicate contagion resulting from interdependencies between one or a group of firms and a group of related firms.

2 The information transfer effects are usually documented between the announcing and non-announcing firms in the same industry. Some recent studies also focus on information transfers along the supply chain, such as Hertzel, Li, Officer, and Rodgers (2008), Menzly and Ozbas (2006), and Pandit, Wasley, and Zach (2007).

showed that a firm's earnings quality is used by the market to extract information from its earnings announcements (Francis, LaFond, Olsson, and Schipper, 2005) and earnings patterns (Francis, LaFond, Olsson, and Schipper, 2003; Bartov, Givoly, and Hayn, 2002). This evidence is consistent with the notion that earnings of higher quality better reflect operating fundamentals of a firm and thus reinforce the pricing effect of that firm.



FIQURE 1 Dissemination and Earnings Quality of Quarterly Earnings Information

Given the context of information transfers, I expect that earnings of higher quality also contain information of higher quality about a firm's performance on the industry level as well as on the firm-specific level. Therefore, earnings of higher quality could better help investors to evaluate non-announcing firms as well. In addition, although earnings have been documented as a better predictor than current cash flows for a firm's future cash flows (Barth, Cram, and Nelson, 2001), the accrual components of earnings are involved in both management judgment and estimates, which may weaken the relation between current earnings and future cash flows. Investors may not be able to fully understand the information contained in earnings, which can then result in firms with high (discretionary) accruals being overpriced (Sloan, 1996; Xie, 2001). Earnings quality may significantly affect the ability of market participants to use information contained in earnings (accruals). A theoretical study (Lambert, Leuz, and Verrecchia, 2007) also explains how the degree of precision of information affects a firm's pricing effect. Thus, this study uses earnings quality measures to capture the degree of precision of earnings

information available to the market regarding revaluing a non-announcing firm in the same industry and form the following hypothesis in the alternative form:

H: Ceteris paribus, earnings quality of announcing firms positively affects the magnitude of information transfers, surrounding the quarterly earnings announcement.

III. Research Design

Earnings Quality Measures

As suggested in Schipper and Vincent (2003), it is difficult to provide a uniform definition of earnings quality due to different users and different uses of earnings numbers; as a result, it becomes difficult to use a one-dimensional measure to empirically evaluate earnings quality.[3] Since my objective is to study the effect of earnings quality on the magnitude of information transfers, which is measured in the abnormal stock returns of non-announcing firms, the relevant measures are chosen based on the perspectives of participants, such as investors and analysts, in the equity market. Francis, LaFond, Olsson, and Schipper (2004) examine the association between the cost of equity and seven earnings attributes and find that value-relevance and accrual quality are more strongly associated with the cost of equity.[4] This study motivates me to choose earnings response coefficient (ERC), value-relevance, abnormal accruals, and accrual quality measures, which better capture the metrics important to participants in the equity market in terms of extracting information from earnings numbers, as empirical proxies for earnings quality in my study. Although these measures are commonly used in the literature, they are all criticized to some extent.

Similar to Francis et al. (2004), I classify a firm's ERC and value-relevance as "market-based" earnings quality measures and abnormal accruals, estimated from the modified Jones model (Dechow et al. 1995) and accrual quality, derived from the Dechow and Dichev (2002) model as "accrual-based" earnings quality measures. Market-based measures take stock returns into consideration and the implicit assumption is that earnings with higher quality may more closely reflect the economic income, which

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[3] Other definitions (measures) of earnings quality not discussed below are also in the literature. For example, Revsine, Collins, and Johnson (1999) consider earnings to be of high quality when they are sustainable. Mikhail, Walther, and Willis (2003) consider that earnings are of high quality when earnings are closely associated with future cash flows. Kirschenheiter and Melumad (2005) define high quality earnings as earnings that are more informative and closer to the long-run firm value. Richardson, Sloan, Soliman, and Tuna (2005) consider earnings to be of high quality when they persist into the next period. In addition, White, Sondhi, and Frued (2003) consider that earnings are of high quality when they are conservative.

[4] The seven attributes are accrual quality, earnings persistence, predictability, smoothness, value relevance, timeliness, and conservatism.

is represented by the stock returns. In contrast, accrual-based measures are based on accounting information only and derived from the relations among earnings, accruals, and cash flows. The underlying assumption of this type of measures is that earnings with higher quality more accurately reflect the accruals generating process and the accruals allocating process of cash flows to reporting periods.

As the first market-based measure, the ERC measure is estimated from the following equation:

$$UR_{i,t,q} = \delta_0 + \delta_1 UE_{i,t,q} + \varepsilon_{i,t,q} \quad (1)$$

where $UR_{i,t,q}$ is the cumulative abnormal returns surrounding the earnings announcement for firm *i* at quarter *q* of year *t*, measured over a two-day window (-1,0), where abnormal returns are based on the CRSP value-weighted market model. $UE_{i,t,q}$ is the unexpected quarterly earnings for firm *i* at quarter *q*'s announcement date, scaled by the price as the end of that quarter for which earnings are announced, where expected earnings are based on the median of analyst forecasts outstanding within 90 days prior to the earnings announcement. I use the 12 most recent quarters that have non-missing data for returns and unexpected earnings to estimate δ_1 and use the absolute value of δ_1 as firm i's measure of earnings quality in quarter *q-1* of year *t*, noted as $EQ\ (ERC\_ABS)_{i,t,q-1}$. A higher value indicates a greater level of high earnings quality.

The second market-based measure is value-relevance, measured as the adjusted R^2 from a regression of the returns on the level and the change of earnings, following Collins, Maydew, and Weiss (1997) and Francis and Schipper (1999), and slightly adjusted for the quarterly data. This construct is believed to capture both relevance and reliability of earnings numbers. Specifically, the following regression is used:

$$RETURN_{i,t,q} = \lambda_0 + \lambda_1 EARN_{i,t,q} + \lambda_2 \Delta EARN_{i,t,q} + \gamma_{i,t,q} \quad (2)$$

where:

$RETURN_{i,t,q}$ = firm *i*'s three-month stock returns ending at the end of quarter *q* of year *t*. [5]

$EARN_{i,t,q}$ = firm *i*'s net income before extraordinary items of quarter *q* of year *t* scaled by the market value at the end of quarter *q*-1 of year *t*.

[5] There is no specific rule of measuring stock returns at the fiscal quarter end, one month after the fiscal quarter end, or two months after the fiscal quarter end. I use the return data of one-month-after and two-month-after to perform robustness checks, and the significance and the sign of the regression coefficients do not change with the alternative measuring time periods.

$\Delta EARN_{i,t,q}$ = firm *i*'s change in net income before extraordinary items between quarter *q* of year *t* and quarter *q* of year *t-1*, scaled by market value at the end of quarter *q-1* of year *t*.

I use the data of the 12 most recent quarters for returns and earnings to calculate the adjusted R^2 and noted as $EQ\ (VR)_{i,t,q-1}$. A higher value indicates a greater level of high earnings quality.

The first accrual-based measure is based on the abnormal accruals. To calculate the abnormal accruals estimated from the modified Jones model (Dechow et al., 1995), I estimate the following firm-level cross-sectional regression (where all of the variables are scaled by the firm's total assets at the end of quarter *q-1* of year *t* [6]:

$$TA_{i,t,q} = \mu_0 + \mu_1 \Delta REV_{i,t,q} + \mu_2 PPE_{i,t,q} + \iota_{i,t,q} \quad (3)$$

where:

$TA_{i,t,q}$ = firm *i*'s total accruals over quarter *q* of year *t*, which equals $\Delta CA_{i,t,q} - \Delta CL_{i,t,q} - \Delta Cash_{i,t,q} + \Delta DEBT_{i,t,q} - DEP_{i,t,q}$

$\Delta CA_{i,t,q}$ = firm *i*'s change in current assets between quarter *q* of year *t* and quarter *q*-1 of year *t*.

$\Delta CL_{i,t,q}$ = firm i's change in current liabilities between quarter *q* of year *t* and quarter *q*-1 of year *t*.

$\Delta Cash_{i,t,q}$ = firm *i*'s change in cash between quarter *q* of year *t* and quarter *q-1* of year *t*.

$\Delta DEBT_{i,t,q}$ = firm *i*'s change in debt in current liabilities between quarter *q* of year *t* and quarter *q*-1 of year *t*.
When *DEBT* is unavailable, it is set to zero.

$DEP_{i,t,q}$ = firm *i*'s depreciation and amortization expense over quarter *q* of year *t*.

$\Delta Rev_{i,t,q}$ = firm *i*'s change in sales between quarter q of year *t* and quarter *q*-1 of year *t*.

$PPE_{i,t,q}$ = firm *i*'s gross value of PPE over quarter *q* of year *t*.

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[6] I also construct this measure based on the unsigned performance-matched abnormal accruals, where abnormal accruals are derived from the modified Jones model (Dechow et al., 1995) and the performance-matching procedure as introduced by Kothari, Leone, and Wasley (2005). It is well documented that the accruals process is correlated with firm performance (McNichols, 2000), and, without controlling for firm performance, the residual estimated from the modified Jones model may contain nondiscretionary accruals. I apply the matching-sample approach based on the returns on assets within the two-digit SIC industry. The results are similar to those of which without the performance-matched procedure (not tabulated).

I estimate the model respectively for each industry group based on a 2-digit SIC code in a given quarter. Fifteen firms are required for each industry group. The industry-quarter specific coefficients estimated from equation (4) are used to calculate firm- and quarter-specific normal accruals as:

$$NA_{i,t,q} = \hat{\mu}_0 + \hat{\mu}_1(\Delta REV_{i,t,q} - \Delta AR_{i,t,q}) + \hat{\mu}_2 PPE_{i,t,q} \quad (4)$$

where $\Delta AR_{i,t,q}$ is firm i's change in accounts receivable between quarter *q* of year *t* and quarter *q*-1 of year *t*. I adjust the change in revenues for the change in accounts receivable to capture any potential accounting discretion arising from credit sales when calculating normal accruals. Abnormal accruals are the difference between total accruals and normal accruals. I do not intend to distinguish accrual-increasing and accrual-decreasing earnings management, both of which affect a firm's earnings quality. Therefore, I use the mean of the absolute value of the abnormal accruals calculated over the 12 most recent quarters, noted as $EQ\ (ABS\_Accrulas)_{i,t,q\text{-}1}$. A higher value indicates a greater level of low earnings quality.

The second accrual-based measure is accrual quality, derived from the Dechow and Dichev's (2002) measure and adjusted for the quarterly data. Dechow and Dichev (2002) argue that the quality of accruals and earnings is decreasing if working capital accruals are less closely matched into the realization of operating cash flows. In particular, the accrual quality measure captures the matching errors in accruals by regressing the working capital accruals on the operating cash flows of the past, current, and future periods. The unexplained portion in the regression is used as a basis to measure earnings quality. The accrual quality measure captures both the discretionary and non-discretionary matching errors in accruals and does not try to distinguish the various factors that affect the association between working capital accruals and a realization of operating cash flows. I estimate the following firm-level cross-sectional model (where all of the variables are scaled by the firm's total assets at the end of quarter *q*-1 of year *t*:

$$\begin{aligned} TCA_{i,t,q} = {} & \lambda_0 + \lambda_1 CFO_{i,t,q-4} + \lambda_2 CFO_{i,t,q-3} + \lambda_3 CFO_{i,t,q-2} + \lambda_4 CFO_{i,t,q-1} \\ & + \lambda_5 CFO_{i,t,q} + \lambda_6 CFO_{i,t,q+1} + \lambda_7 CFO_{i,t,q+2} + \lambda_8 CFO_{i,t,q+3} \\ & + \lambda_9 CFO_{i,t,q+4} + \varepsilon_{i,t,q} \end{aligned} \quad (5)$$

where:

$TA_{i,t,q}$ = firm i's total accruals over quarter q of year t, which equals $\Delta CA_{i,t,q} - \Delta CL_{i,t,q} - \Delta Cash_{i,t,q} + \Delta DEBT_{i,t,q} - DEP_{i,t,q}$

$\Delta CA_{i,t,q}$ = firm *i*'s change in current assets between quarter *q* of year *t* and quarter *q*-1 of year *t*.

$\Delta CL_{i,t,q}$ = firm *i*'s change in current liabilities between quarter *q* of year *t* and quarter *q*-1 of year *t*.

$\Delta Cash_{i,t,q}$ = firm *i*'s change in cash between quarter *q* of year *t* and quarter *q*-1 of year *t*.

$\Delta DEBT_{i,t,q}$ = firm *i*'s change in debt in current liabilities between quarter q of year *t* and quarter *q*-1 of year *t*.
When *DEBT* is unavailable, it is set to zero.

$DEP_{i,t,q}$ = firm *i*'s depreciation and amortization expense over quarter *q* of year *t*.

$TCA_{i,t,q}$ = firm *i*'s total current accruals over quarter q of year *t*, which equals $\Delta CA_{i,t,q} - \Delta CL_{i,t,q} - \Delta Cash_{i,t,q} + \Delta DEBT_{i,t,q}$

$CFO_{i,t,q}$ = firm *i*'s operating cash flows over quarter *q* of year *t*, which equals $NIBE_{i,t,q} - TA_{i,t,q}$

$NIBE_{i,t,q}$ = firm *i*'s income before extraordinary items over quarter *q* of year *t*.

I estimate the model respectively for each industry group based on a 2-digit SIC code in a given quarter. Fifteen firms are required for each industry group. The industry-quarter specific coefficients estimated from equation (6) are used to calculate firm-and quarter-specific Dechow and Dichev (2002) estimated $TCA_{i,t,q}$, which is as follows:

$$\begin{aligned} TCA_{i,t,q} = {} & \lambda_0 + \lambda_1 CFO_{i,t,q-4} + \lambda_2 CFO_{i,t,q-3} + \lambda_3 CFO_{i,t,q-2} + \lambda_4 CFO_{i,t,q-1} \\ & + \lambda_5 CFO_{i,t,q} + \lambda_6 CFO_{i,t,q+1} + \lambda_7 CFO_{i,t,q+2} + \lambda_8 CFO_{i,t,q+3} \\ & + \lambda_9 CFO_{i,t,q+4} \end{aligned} \quad (6)$$

The residual is the difference between actual *TCA* and the estimated *TCA*. Consistent with the prior measure, I use the standard deviation of the residuals calculated over the 12 most recent quarters that have non-missing data, noted as $EQ\ (AQ)_{i,t,q-1}$. A higher value indicates a greater level of low earnings quality.

Regression Model

The announcing firm is defined as a firm whose quarterly earnings announcement is the first announcement in its industry group to control for the timing and clustering effects as suggested in Freeman and Tse (1992) and Asthana and Mishra (2001) for the following reasons. First, since the amount of information used to value non-announcing firms decreases in the announcement sequence, restricting the sample to the first announcement each industry-quarter increases the power of the test. Second, Asthana and Mishra (2001) show that the first announcement in each industry-quarter is less likely to

be clustered with the following announcements. Non-announcing firms are defined as firms with the same 3-digit SIC code as the announcing firms and with their earnings releases at least one trading day later than the announcing firms' earnings releases.[7,8] To reduce the concern of contemporaneous announcements, the industry-quarter observations (including both announcing and non-announcing firms) are excluded if two firms in the same industry first make earnings announcement on the same day. The magnitude of information transfers is measured in the non-announcing firms' abnormal returns upon the earnings announcements of quarter *q* of year *t*. The measures of earnings quality are calculated based on the data rolling over the 12 most recent quarters that have non-missing data (basically, a three-year window) until one quarter prior to the quarter of the earnings announcement. This design ensures that information needed to evaluate the earnings quality of the announcing firm, which is contained in the financial statements of quarter *q*-1 of year *t* and of prior quarters, is publicly available.

I employ the following pooled cross-sectional regression model, with a measure of earnings quality as an explanatory variable, controlling for the amount of earnings information and other determinants that have been shown to affect the magnitude of information transfers:

$$\begin{aligned} ABS\_CARs_{j,t,q} = {} & \beta_0 + \beta_1 ABS\_UE_{i,t,q} + \beta_2 EQ_{i,t,q-1} + \beta_3 ABS\_UE_{i,t,q} \\ & \times EQ_{i,t,q-1} + Control\ Variables + YearDummy \\ & + IndustryDummy + \varepsilon_{i,t} \end{aligned} \tag{7}$$

An equal-weighted portfolio of non-announcing firms is formed for each earnings announcement. $ABS\_CARs_{j,t,q}$ is the average absolute value of cumulative abnormal returns estimated from the market model for a portfolio of non-announcing firms over the two-day window (-1,0) on the earnings announcement date of an announcing firm in quarter *q* of year *t* and is used to measure information transfers (i.e. information transfer effects are presumed to exist when the average abnormal returns of the non-announcing firm portfolios are significantly different from zero). $ABS\_UE_{i,t,q}$, is defined as the absolute value of the difference between the actual earnings and the median of analysts' most recent earnings

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7 Ramnath (2002) use an analyst-based definition to identify peer firms since his study focuses on the responses of analysts of the non-announcing firms to the quarterly earnings announcement of the earlier announcer in the same industry. Identifying peer firms based on the analysts following may increase the power of the test.

8 Foster (1981) also uses the homogeneous line of business classification, in which firms with at least 50 percent of their revenues from an industry line of business are included in the sample and the dominant firm classification, in which only firms whose revenue ranks in the top half in the industry are included. The non-directional results based on SIC classification are similar as those based on the homogeneous line of business classification and the dominant firm classification.

forecasts, made no earlier than 90 days prior to the earnings announcement, scaled by the stock price at the beginning of quarter q of year t and are used to capture the amount of earnings information.[9] Earnings quality measures ($EQ_{i,t,q\text{-}1}$) are calculated over the 12 most recent quarters that have non-missing data until quarter q-1 of year t and the details are discussed later. The subscript i indicates announcing firms and the subscript j indicates non-announcing firms. The coefficient (β_3) on the interaction term measures the incremental impact of earnings quality on the magnitude of information transfers.

Unexpected earnings of announcing firms and abnormal returns of non-announcing firms need not have the same sign. The direction of the stock price response of non-announcing firms depends on the nature of the announced earnings affecting the industry and competition. The information contained in earnings may reflect the general perspectives of the industry (contagion effects) or may signal a change in the competitive position of announcing versus non-announcing firms (competitive effects). To avoid the concern that the contagion effect and the competitive effect offset each other (Kim, Lacina, and Park, 2008), the non-directional unexpected earnings of announcing firms and the non-directional abnormal returns of non-announcing firms are used in the multivariate test.[10]

In Eq. (7), several determinants of the magnitude of information transfers are controlled. First, I control for the firm size of announcing firms (*Size (A)*, the natural log of the capitalized value). Prior research, such as Atiase (1987) and Freeman (1987), argues that information production and dissemination by private parties is increasing in firm size since private parties are drawn to larger firms by higher expected trading profits. Therefore, the information conveyed to the market by public announcements (e.g., earnings announcements)is inversely related to the firm size. Han and Wild (2000) find the empirical evidence to support this argument. Contrary to Han and Wild (2000), Schoderbek (1995) finds that industry-wide information is usually transferred from the

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[9] The announcing firm's abnormal returns are also used as a proxy for the unexpected component of the firm's earnings release in prior studies, such as Foster (1981) and Clinch and Sinclair (1987). However, this use is subject to a problem of overstating the significance of information transfers due to the cross-sectional covariation in stock returns (Dietrich, 1989 and Frost, 1995). To avoid this critique, a more direct measure for the amount of earnings information, unexpected earnings, is being used in the latter studies. As Frost (1995) points out, due to the measurement errors embedded in the use of the unexpected earnings, this approach may underestimate information transfers, in contrast to the use of a firm's abnormal returns that may overestimate information transfers. Besides, the announcing firm's abnormal stock returns also reflect other information released on the announcement date, since firms usually announce other news or make a forecast together with their quarterly earnings announcements. This study especially focuses on the information contained in earnings; therefore, an earnings measure may be more appropriate than a returns measure.

[10] Prior research shows that the contagion effects usually dominate the competitive effects (i.e. the abnormal returns of non-announcing firms and the unexpected earnings of the announcing firms are positively associated).

dominant firms to the fringe firms. Using a different research design from that in Han and Wild (2000), Asthana and Mishra (2001) find that information transfers are positively associated with the announcing firm's size.[11] While the impact of firm size is not clear, it does affect the magnitude of information transfers. Therefore, I control for the announcing firm's size, which is measured in the natural log of the market value of common shares outstanding at the end of quarter *q* of year *t*. Second, I also control for the average firm size of the portfolio of non-announcing firms each industry-quarter firms *(Size(NA,)* natural log of the capitalized value of the equally-weighted portfolio). While Asthana and Mishra (2001) do not reject the hypothesis that the magnitude of information transfers is not affected by the non-announcing firm's size, Han and Wild (2000) show that the size of non-announcing firms is inversely related to the magnitude of information transfers. Third, the industry concentration is controlled through the Herfindahl index (*Herfindahl Index*, the sum of the squares of market shares of each firm in the same 3-digit SIC code industry for each industry-quarter) based on the notion that information transfers should be observed in highly concentrated industries since industries of this type generally consist of a small number of large and interdependent firms (Frost, 1995). Fourth, to avoid the problem that the empirical tests only capture the co-movement of the returns of firms within the same industry, the correlation between the daily returns of announcing and of non-announcing firms in the prior year is controlled.[12] Fifth, following prior research, such as Matsumoto (2002), an indicator variable is used for the fourth fiscal quarter (*Qtr4*) to capture the quality difference between earnings numbers of the fourth quarter and of the other three quarters, since firms are under greater auditor scrutiny and tend to report special items in the fourth quarter. Year and 2-digit SIC industry indicators are also incorporated.

IV. Sample Selection and Empirical Results

Sample Selection

The sample period for this study spans 48 quarters from the years 1995 to 2006. Firms with non-calendar fiscal quarters are removed. The companies with mergers, acquisitions, or discontinued operations, as indicated by Compustat, are excluded, since

[11] Another measure, the number of analysts following, is usually used to proxy for the amount of information production and dissemination of a firm as well in prior research; therefore, I control for this variable and the coefficient on it is not statistically significant. This result is consistent with that of Han and Wild (2000). Since the number of analysts following and firm size is highly correlated, to avoid the multicollinearity problem, I only control for the firm size in the main tests.

[12] This problem has been examined in prior research, such as Foster (1981) and Han and Wild (1990).

these transactions can affect the accuracy of the coefficient estimates in the accrual models.[13]

The sample selection criteria are as follows, and the detailed procedure is in Table 1:

1. The financial firms (SIC 6000-6999) and utilities (SIC 4900-4999) are removed.
2. The stock of a firm has a market price at the end of quarter q of year t greater than $5. This procedure is to mitigate the potential trading illiquidity concern that might add noise to the pricing analysis.
3. A firm has total assets at the end of quarter q of year t that equal or exceed $1 million dollars.
4. The firms' quarterly earnings announcement dates are available on Compustat.[14]
5. The firms have earnings announcements within 80 days of the end of each quarter to remove erroneous announcement dates.
6. Both the analyst forecasts of EPS and actual EPS are available on I/B/E/S.
7. Stock return data is available on CRSP to facilitate the estimation of the market model and the abnormal returns around earnings announcements.
8. The necessary Compustat data is available for calculating the measures of earnings quality and control variables.

The sample selection of announcing and non-announcing firms over 1995-2006 is presented as follows.

Two samples are constructed. The first sample contains five firms with the largest market share of each industry and requires that these five firms account for at least 50% of the total market share in each industry. This selection is building on an oligopolistic setting and is employed in prior research such as Tookes (2008) and Kovacs (2007). The reported results are based on this sample since this setting is theoretically and empirically documented to be better capturing intra-industry information transfers. This sample is composed of 137 industries, totaling 3,179 industry-quarters. The firm size in terms of the market capitalization varies in a large range between 73.84 million dollars and 111,215.57 million dollars. The average level of industry concentration, measured as the Herfindahl index, varies between 0.07 and 0.82. The second sample is composed of the first announcement in each industry group and any firms whose 3-digit SIC code is the same as the announcing firms and whose earnings releases are at least one trading day

[13] As suggested in Hribar and Collins (2002) and McNichols (2002), these transactions cause the accruals and sales to be based on a different entity.

[14] A test is conducted in which the earnings announcement date is either from Compustat or IBES whichever is earlier and the results do not change.

later than the announcing firms' earnings releases.[15] The second sample contains both small and large firms and the results of this sample are similar as those of the first sample for *EQ (ABS_ERC)*, *EQ (ABS_Accruals)*, and *EQ (AQ)* but weaker for *EQ (VR)*.

Table 1 Sample Selection

Selection Procedures	The number of firm-quarter observations in the sample Announcing/Non-announcing	
All firm-quarter observations whose fiscal period ends on December 31 from the quarterly COMPUSTAT file over 1995-2006. Financial firms (SIC 6000-6999) and utilities (SIC 4900-4999) are removed.	256,555	
Firm-quarter observations not meeting the following requirements are excluded:	243,097	
U.S. firms (ADR firm observations are excluded.)		
The stock of a firm has a market price at the end of quarter q of year t which equals or exceeds $5. A firm has total assets at the end of quarter q of year t that equal or exceed one million dollars.	164,309	
Earnings announcement dates are available on COMPUSTAT.	158,775	
Firms have earnings announcements within 80 days after the end of each quarter.	157,428	
The sales data is available on COMPUSTAT to calculate the Herfindahl index. Stock price and shares outstanding data is available on COMPUSTAT to calculate firm size.	152,969	
A sample of firms that is likely to have strong and /or well defined product market relations-large firms in highly concentrated industries. Five firms are with the largest market shares from each three-digit SIC industry, and required that these five firms account for at least 50% of the total industry sales.	5,683	22,732
Non-announcing firms released earnings one trading day later than announcing firms' announcements. (i.e. An industry-quarter observation is excluded if two firms in the same industry first make earnings announcement on the same day)	3,886	15,544
Analyst forecast consensus of EPS prior to the quarterly earnings announcement and actual EPS are available on I/B/E/S.	3,186	12,744
Stock prices are available on CRSP to facilitate the two-day CARs.	3,179	12,583

[15] This sample is not required to have a minimum number of firms in each industry group. If there are very few peer firms in the industry group, idiosyncratic price movements might confound the test.

Intra-Industry Information Transfers

To avoid the influence of outliers, the analyses are conducted at the portfolio level. In particular, I form deciles in each quarter based on the unexpected earnings (UE) and the abnormal returns of announcing firms and assign a rank to each decile. In each decile,

I calculate abnormal returns of announcing firms and of non-announcing firms. Consistent with prior studies, Panel A of Table 2 documents that the deciles with larger UE (which are based on analyst forecast errors) display higher average abnormal returns of non-announcing firms than the deciles with smaller UE although not monotonically and not significantly for some deciles. The abnormal returns of non-announcing firms range from -0.09% to 0.25%, and the abnormal returns of announcing firms range from -2.03% to 2.82%. The regression estimation in Panel C of Table 2 confirms the positive association between the announcer's directional unexpected earnings and non-announcing firms' directional abnormal returns (p=0.004).

Some prior studies also use abnormal returns of announcing firms on the earnings announcement date as a proxy to capture the amount of earnings information. I form deciles in each quarter based on this measure in Panel B of Table 2 and consistent with prior studies, there is a significantly positive association between the abnormal returns of announcing firms and of non-announcing firms. The abnormal returns of non-announcing firms range from -0.48% to 1.03%, and the abnormal returns of announcing firms range from -6.17% to 7.22%. The regression estimate in Panel C of Table 2 confirms the positive association between announcing and non-announcing firms' abnormal returns. The results from both the unexpected earnings rank and the abnormal returns rank indicate that information transfers are predominantly contagious. Although both the unexpected earnings and abnormal returns of announcing firms are shown to be positively associated with the abnormal returns of non-announcing firms, the association between abnormal returns of announcing firms and of non-announcing firms is much stronger than that between unexpected earnings of announcing firms and abnormal returns of non-announcing firms. (The adjusted R^2 is 7.09% vs. 0.23% in Panel C of Table 2; the Pearson correlation is 0.27 vs. 0.04 in Table 3.) This reflects that the non-announcing firms' market reaction is not confined to the announcer's earnings per se, but the market also reacts to other information conveyed with earnings simultaneously. In this study, I especially focus on information contained in earnings. In addition, the use of the market reaction of announcing firms to measure the amount of earnings information may cause overstatement of information transfers due to the cross-security return co-movement, which is independent of the information signal of announcing firms (Foster, 1981 and Frost, 1995). Therefore, the unexpected earnings, instead of the abnormal returns, of

announcing firms are used in the multivariate tests. Table 2 reports the abnormal returns of announcing and of non-announcing firms around the announcing firms' earnings announcement dates.

Table 2 Intra-Industry Information Transfers

Deciles based on the amount of earnings information	Average abnormal returns for announcing firms	Average abnormal returns for announcing firms (t-statistics)	Average abnormal returns for non-announcing firms	Average abnormal returns for non-announcing firms (t-statistics)
Panel A: Deciles based on the unexpected earnings of announcing firms (Unexpected earnings are measures in analyst forecast errors)				
1	-0.0203	(-9.37)	-0.0009	(-0.57)
2	-0.0149	(-8.16)	-0.0022	(-1.85)
3	-0.0049	(-2.87)	-0.0006	(-0.44)
4	-0.0059	(-2.86)	0.0008	(0.59)
5	0.0034	(1.86)	0.0001	(0.08)
6	0.0062	(3.20)	0.0005	(0.45)
7	0.0156	(8.18)	0.0003	(0.20)
8	0.0095	(4.73)	0.0003	(0.21)
9	0.0195	(8.79)	0.0024	(1.75)
10	0.0282	(11.83)	0.0025	(1.84)
10-1	0.0485***	p-value:0.00	0.0034*	p-value:0.07
Panel B: Deciles based on the abnormal returns of announcing firms				
1	-0.0617	(-24.36)	-0.0048	(-3.46)
2	-0.0247	(-14.16)	-0.0028	(-2.18)
3	-0.0148	(-8.46)	-0.0034	(-2.56)
4	-0.0025	(-1.40)	-0.0022	(-1.84)
5	0.0027	(1.50)	-0.0003	(-0.25)
6	0.0081	(4.87)	-0.0006	(-0.46)
7	0.0088	(5.06)	0.0013	(1.02)
8	0.0178	(9.04)	0.0007	(0.56)
9	0.0309	(15.75)	0.0050	(3.63)
10	0.0722	(30.97)	0.0103	(7.57)
10-1	0.1339***	p-value:0.00	0.0151***	p-value:0.00

Table 2 Intra-Industry Information Transfers (Continued)

Panel C: Regression Estimations		
Dep. Variable = CARs (NA)	Model 1	Model 2
Intercept	0.025***	0.005***
	(<0.001)	(<0.001)
UE(A)	0.130***	
	(0.004)	
CARs(A)		0.586***
		(<0.001)
Adj. R-square (%)	0.23	7.09

1. All the variables are defined in Appendix.
2. "A" implies announcing firms and "NA" implies non-announcing firms.
3. ***, **, and * signify significance at 1%, 5%, and 10% levels.

Table 3 Pearson Correlations between Unexpected Earnings and Abnormal Returns

	Rank on Unexpected Earnings (A)	Rank on Abnormal Returns (A)
Abnormal Returns (NA)	0.04**	0.27***
Abnormal Returns (A)	0.19***	

1. The rank on unexpected earnings (A) is the decile rank sorted by the difference between the announcing firms' actual earnings per share and the latest median analyst forecast for the same quarter, scaled by the stock price in the beginning of the quarter.
2. The rank on abnormal returns (A) is the decile rank sorted by the abnormal returns of the announcing firms.
3. Abnormal returns (NA) are the cumulative abnormal returns in quarter q of year t for non-announcing firms over the two-day window on the announcing firm's earnings announcement date.
4. "A" indicates announcing firms and "NA" indicates non-announcing firms.
5. ***, **, and * signify significance at 1%, 5%, and 10% levels.

Earnings Quality Measures

The following tables report the empirical results of four earnings quality measures respectively. Each measure requires the data rolling over the 12 most recent quarters. The sample sizes for the ERC, value-relevance, abnormal accruals, and accrual quality measures are 2,093, 2,193, 1,167, and 1,508 industry-quarters, respectively. Table 4 presents the descriptive statistics for each subsample. It shows that announcing firms are significantly larger in terms of the market capitalization, on average, than are non-announcing firms (p=0.00). The abnormal returns of announcing firms at the announcement date are significantly larger than the abnormal returns of non-announcing firms. The Herfindahl index for each industry ranges between 0.071 and 0.928, and the mean is around 0.288. *EQ (ABS_ERC)* is set to capture the earnings quality of announcing firms, of which the range is between 0.00 and 687.955; *EQ (VR)* ranges

between 0.0001 and 0.909; *EQ (ABS_Accruals)* ranges between 0.005 and 0.320; and *EQ (AQ)* ranges between 0.002 and 0.218.

Table 4 Descriptive Statistics for the Four Subsamples

Variable	Mean	Standard Deviation	Min	Median	Max
Panel A: ERC Sample (2,093 observations)					
Size (A)	8.053	1.682	3.373	7.961	13.256
Size (NA)	7.345	1.472	3.805	7.222	11.997
ABS_UE (A)	0.002	0.008	0.000	0.0006	0.284
ABS_CARs (A)	0.034	0.038	0.00001	0.022	0.534
ABS_CARs (NA)	0.025	0.017	0.002	0.021	0.152
CORR	0.258	0.179	-0.080	0.223	0.859
Herfindahl Index	0.292	0.151	0.071	0.257	0.928
N	19.440	33.612	5	10	487
EQ (ABS_ERC)	34.821	59.709	0.000	12.908	687.955
Panel B: Value Relevance Sample (2,193 observations)					
Size (A)	8.031	1.717	3.373	7.943	13.256
Size (NA)	7.333	1.471	3.653	7.210	11.997
ABS_UE (A)	0.002	0.008	0.000	0.001	0.284
ABS_CARs (A)	0.034	0.040	0.0001	0.022	0.678
ABS_CARs (NA)	0.025	0.017	0.002	0.020	0.152
CORR	0.259	0.181	-0.080	0.225	0.860
Herfindahl index	0.292	0.151	0.071	0.258	0.928
N	19.138	32.871	5	10	487
EQ (VR)	0.234	0.183	0.0001	0.197	0.909
Panel C: Abnormal Accruals Sample (1,167 observations)					
Size (A)	8.113	1.668	3.373	8.082	12.522
Size (NA)	7.486	1.495	3.653	7.395	11.702
ABS_UE (A)	0.002	0.005	0.000	0.001	0.098
ABS_CARs (A)	0.033	0.035	0.0001	0.021	0.298
ABS_CARs (NA)	0.025	0.019	0.002	0.020	0.152
CORR	0.262	0.174	-0.0587	0.231	0.810
Herfindahl Index	0.265	0.124	0.071	0.238	0.914
N	20.247	31.609	5	12	487
EQ (ABS_Accruals)	0.042	0.038	0.005	0.029	0.320

Table 4 Descriptive Statistics for the Four Subsamples (Continued)

Variable	Mean	Standard Deviation	Min	Median	Max
Panel D: Accrual Quality Sample (1,508 observations)					
Size (A)	7.989	1.599	3.373	7.972	12.522
Size (NA)	7.393	1.448	3.653	7.250	11.997
ABS_UE (A)	0.002	0.005	0.000	0.0005	0.098
ABS_CARs (A)	0.034	0.036	0.0001	0.022	0.391
ABS_CARs (NA)	0.025	0.019	0.002	0.020	0.157
CORR	0.260	0.172	-0.062	0.230	0.814
Herfindahl Index	0.276	0.137	0.068	0.245	0.928
N	18.573	24.965	5	10	235
EQ (AQ)	0.017	0.015	0.002	0.014	0.218

1. The sample period is 1995/1-2006/4.
2. The industry classification is based on the 3-digit SIC code and financial firms (SIC 6000-6999) and utilities (SIC 4900-4999) are removed.
3. All the variables are defined in Appendix.

Table 5 contains the Pearson and Spearman correlations among the variables examined in Table 4. This table illustrates that the abnormal returns of non-announcing firms are significantly positively correlated with both the unexpected earnings and abnormal returns of announcing firms. (Both the Pearson and Spearman correlations are significant at the 5% level for each subsample). Furthermore, the firm size of both announcing and non-announcing firms is negatively correlated to the abnormal returns of non-announcing firms; the Herfindahl index and the abnormal returns of non-announcing firms are positively correlated.

I further take a look at the correlations between each earnings quality measure and the abnormal returns of non-announcing firms; it seems that there is no obvious association. Basically, the correlations among variables provide an initial examination for the association between earnings quality and information transfers. The amount of earnings information has to be controlled when the quality of earnings information is examined, so I next turn to the multivariate tests in which the influencing factors are controlled.

Panel A of Table 6 illustrates that the phenomenon of information transfers is observed no matter whether the non-directional unexpected earnings or non-directional abnormal returns of announcing firms are used to capture the information flow into the market, even after the correlation of returns of announcing and of non-announcing firms is controlled.

Panel B of Table 6 reports the regression results for the full model. It illustrates that the firm size of non-announcing firms is significantly inversely associated with the non-directional abnormal returns of non-announcing firms ($p<0.001$), which is consistent with the finding in Han and Wild (2000) and supports the size-related information hypothesis. The coefficients on firm size of announcing firms and on the Herfindahl index are not significant. After the amount of earnings information is controlled, the coefficient on the interaction term of unexpected earnings and earnings quality is significantly positive for the ERC measure ($p=0.007$) and the value relevance measure ($p=0.038$) but not significant for the abnormal accrual measure ($p=0.927$) and the accrual quality measure ($p=0.412$). It suggests that the incremental impact of earnings quality on the magnitude of information transfers exists when the market-based measures are used but not when the accrual-based measures are used.

To run the directional test as well as to reduce the concern that the contagion effect and the competiveness effect offset each other and, therefore, leading to an overall finding of no information transfers in the directional test, I partition the sample into the positive and the negative subsamples. The positive (negative) subsample includes observations where the unexpected earnings of announcing firms and the abnormal returns of non-announcing firms have the same (different) sign. The results (not tabulated) show that the coefficients on the interaction terms of unexpected earnings and the earnings quality measures are similar as in Panel B of Table 6 except that the coefficient on the value-relevance measure for the negative subsample is not significant.

Furthermore, the magnitude of information transfers may vary with the industry characteristics such as industry growth, profitability, and concentration. Various checks are also performed with respect to industry characteristics. Specifically, I partition the sample into industries of high and low growth (based on the book to market ratio), industries of high and low profitability (based on the returns on assets), and industries of high and low concentration (based on the Herfindahl index), and the results are not sensitive to these partitions.

Table 5 Person (Spearman) Correlations above (below) the Diagonal for the Four Subsamples

Panel A: ERC Sample (2,093 observations)

	ABS_UE (A)	*ABS_CARs(A)*	*ABS_CARs(NA)*	*Size (A)*	*Size (NA)*	*CORR*	*Herfindahl Index*	*N*	*EQ(ABS_ERC)*
ABS_UE (A)		0.039	0.046	-0.147	-0.055	0.029	-0.019	-0.036	-0.097
		(0.067)	(0.032)	(<0.001)	(0.011)	(0.181)	(0.366)	(0.095)	(<0.001)
ABS_CARs(A)	0.084		0.211	-0.117	-0.048	-0.065	-0.014	-0.015	0.024
	(<0.001)		(<0.001)	(<0.001)	(0.025)	(0.003)	(0.524)	(0.473)	(0.270)
ABS_CARs(NA)	0.058	0.187		-0.125	-0.203	-0.154	0.090	-0.025	0.004
	(0.007)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.249)	(0.852)
Size (A)	-0.262	-0.087	-0.133		0.551	0.425	0.006	0.358	0.229
	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(0.796)	(<0.001)	(<0.001)
Size (NA)	-0.095	-0.045	-0.267	0.539		0.586	-0.375	0.502	0.124
	(<0.001)	(0.038)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(<0.001)
CORR	0.043	-0.073	-0.202	0.475	0.644		-0.210	0.114	-0.023
	(0.052)	(0.001)	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(0.296)
Herfindahl	0.023	0.009	0.078	-0.098	-0.370	-0.300		-0.257	-0.059
Index	(0.283)	(0.690)	(<0.001)	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(0.007)
N	-0.101	-0.024	-0.109	0.425	0.644	0.393	-0.621		0.175
	(<0.001)	(0.255)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)		(<0.001)
EQ(ABS_ERC)	-0.407	-0.007	-0.025	0.304	0.125	-0.001	-0.045	0.168	
	(<0.001)	(0.747)	(0.241)	(<0.001)	(<0.001)	(0.946)	(0.036)	(<0.001)	

Table 5 Person (Spearman) Correlations above (below) the Diagonal for the Four Subsamples (Continued)

Panel B: Value Relevance Sample (2,193 observations)

	ABS_UE (A)	*ABS_CARs(A)*	*ABS_CARs(NA)*	*Size (A)*	*Size (NA)*	*CORR*	*Herfindahl Index*	*N*	*EQ (VR)*
ABS_UE (A)		0.049	0.052	-0.147	-0.056	0.021	-0.018	-0.033	-0.005
		(0.019)	(0.012)	(<0.001)	(0.008)	(0.323)	(0.403)	(0.096)	(0.827)
ABS_CARs(A)	0.082		0.236	-0.100	-0.041	-0.064	-0.016	-0.009	0.058
	(<0.001)		(<0.001)	(<0.001)	(0.049)	(0.003)	(0.441)	(0.667)	(0.006)
ABS_CARs(NA)	0.061	0.179		-0.123	-0.210	-0.152	0.092	-0.022	0.038
	(0.004)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.301)	(0.069)
Size (A)	-0.278	-0.073	-0.137		0.554	0.437	0.005	0.352	-0.043
	(<0.001)	(0.001)	(<0.001)		(<0.001)	(<0.001)	(0.811)	(<0.001)	(0.041)
Size (NA)	-0.106	-0.032	-0.270	0.540		0.587	-0.379	0.499	-0.039
	(<0.001)	(0.132)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(0.065)
CORR	0.021	-0.0003	-0.192	0.488	0.643		-0.319	0.154	-0.069
	(0.315)	(0.989)	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(0.001)
Herfindahl	0.024	-0.025	0.073	-0.087	-0.367	-0.302		-0.259	0.006
Index	(0.252)	(0.226)	(0.001)	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(0.765)
N	-0.103	0.020	-0.103	0.425	0.634	0.405	-0.626		-0.038
	(<0.001)	(0.337)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)		(0.069)
EQ (VR)	-0.045	0.027	0.050	-0.061	-0.033	-0.076	-0.005	0.004	
	(0.035)	(0.204)	(0.017)	(0.004)	(0.110)	(<0.001)	(0.821)	(0.856h)	

Table 5 Person (Spearman) Correlations above (below) the Diagonal for the Four Subsamples (Continued)

Panel C: Abnormal Accruals Sample (1,167 observations)

	ABS_UE (A)	*ABS_CARs (A)*	*ABS_CARs (NA)*	*Size (A)*	*Size (NA)*	*CORR*	*Herfindahl Index*	*N*	*EQ (ABS_Accruals)*
ABS_UE (A)		0.085	0.115	-0.215	-0.070	0.057	-0.022	-0.045	-0.055
		(0.003)	(<0.001)	(<0.001)	(0.015)	(0.050)	(0.449)	(0.115)	(0.053)
ABS_CARs (A)	0.086		0.296	-0.079	-0.041	-0.063	0.009	-0.012	0.059
	(0.003)		(<0.001)	(0.006)	(0.157)	(0.032)	(0.752)	(0.678)	(0.039)
ABS_CARs (NA)	0.126	0.222		-0.170	-0.210	-0.163	0.097	-0.017	-0.086
	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.566)	(0.003)
Size (A)	-0.302	-0.046	-0.189		0.580	0.508	-0.177	0.369	-0.057
	(<0.001)	(0.109)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.049)
Size (NA)	-0.101	-0.036	-0.275	0.570		0.600	-0.404	0.425	0.011
	(<0.001)	(0.210)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(0.703)
CORR	0.014	-0.059	-0.202	0.520	0.646		-0.167	0.126	-0.045
	(0.637)	(0.045)	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(0.124)
Herfindahl	0.018	0.037	0.062	-0.190	-0.392	-0.163		-0.233	-0.005
Index	(0.524)	(0.198)	(0.032)	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(0.861)
N	-0.089	-0.020	-0.074	0.514	0.637	0.299	-0.589		0.024
	(0.002)	(0.478)	(0.010)	(<0.001)	(<0.001)	(<0.001)	(<0.001)		(0.396)
EQ	0.029	0.056	0.007	-0.145	-0.102	-0.028	0.067	-0.108	
(ABS_Accruals)	(0.317)	(0.049)	(0.809)	(<0.001)	(<0.001)	(0.327)	(0.019)	(<0.001)	

Table 5 Person (Spearman) Correlations above (below) the Diagonal for the Four Subsamples (Continued)

Panel D: Accrual Quality Sample (1,508 observations)

	ABS_UE (A)	*ABS_CARs(A)*	*ABS_CARs(NA)*	*Size (A)*	*Size (NA)*	*CORR*	*Herfindahl Index*	*N*	*EQ (AQ)*
ABS_UE (A)		0.092	0.112	-0.213	-0.081	0.041	-0.005	-0.062	-0.023
		(<0.001)	(<0.001)	(<0.001)	(0.001)	(0.113)	(0.825)	(0.017)	(0.357)
ABS_CARs(A)	0.100		0.249	-0.063	-0.030	-0.082	0.026	-0.015	0.125
	(<0.001)		(<0.001)	(0.013)	(0.227)	(0.002)	(0.306)	(0.566)	(<0.001)
ABS_CARs(NA)	0.072	0.189		-0.119	-0.180	-0.156	0.084	-0.065	0.010
	(0.004)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.013)	(0.693)
Size (A)	-0.304	-0.034	-0.121		0.559	0.487	-0.121	0.482	-0.061
	(<0.001)	(0.180)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.016)
Size (NA)	-0.148	-0.018	-0.229	0.525		0.584	-0.372	0.576	0.005
	(<0.001)	(0.475)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(<0.001)	(0.858)
CORR	-0.003	-0.080	-0.200	0.498	0.618		-0.273	0.246	-0.079
	(0.910)	(0.002)	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(<0.001)	(0.002)
Herfindahl	0.053	0.043	0.040	-0.149	-0.352	-0.246		-0.330	-0.064
Index	(0.037)	(0.091)	(0.115)	(<0.001)	(<0.001)	(<0.001)		(<0.001)	(0.012)
N	-0.152	-0.035	-0.076	0.483	0.631	0.389	-0.591		0.018
	(<0.001)	(0.182)	(0.004)	(<0.001)	(<0.001)	(<0.001)	(<0.001)		(0.496)
EQ (AQ)	0.002	0.060	0.047	-0.087	-0.023	-0.089	-0.035	-0.017	
	(0.925)	(0.017)	(0.060)	(<0.001)	(0.370)	(0.001)	(0.163)	(0.503)	

Table 6 Regression Estimations for the Four Subsamples

Panel A								
Subsample	*ERC*		*Value Relevance*		*Abnormal Accruals*		*Accrual Quality*	
Number of Observations	2,093		2,193		1,167		1,508	
Dep. Variable: *ABS_CARs (NA)*	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	0.029***	0.025***	0.028***	0.025***	0.030***	0.025***	0.029***	0.025***
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
ABS_UE (A)	0.113**		0.126***		0.437***		0.385***	
	(0.018)		(0.007)		(<0.001)		(<0.001)	
ABS_CARs (A)		0.090***		0.100***		0.156***		0.120***
		(<0.001)		(<0.001)		(<0.001)		(<0.001)
CORR	-0.015***	-0.014***	-0.015***	-0.013***	-0.019***	-0.016***	-0.017***	-0.015***
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
Year and industry dummies	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Adj. R-square (%)	2.25	6.09	2.54	7.18	4.05	10.83	3.43	7.70

1. The sample period is 1995/1-2006/4, and the sample consists of the five firms with the largest sales in each industry and requires that the total sales of these five firms account for at least 50% of the total industry sales.
2. The industry classification is based on the 3-digit SIC code and financial firms (SIC 6000-6999), and utilities (SIC 4900-4999) are removed.
3. The subsample requires the data availability for calculating each earnings quality measure, and the size of each subsample is specified as following. ***, **, and * signify significance at 1%, 5%, and 10% levels.

$$ABS\_CARs_{j,t,q} = \beta_0 + \beta_1 ABS\_UE_{i,t,q} + \beta_2 EQ_{i,t,q-1} + \beta_3 ABS\_UE_{i,t,q} \times EQ_{i,t,q-1} + Control\ Variables + YearDummy + IndustryDummy + \varepsilon_{i,t} \quad (7)$$

Table 6 Regression Estimations for the Four Subsamples (Continued)

Panel B Subsample Number of Observations Dep. Variable: *ABS_CARs (NA)*	*ERC* 2,093	*Value Relevance* 2,193	*Abnormal Accrual* 1,167	*Accrual Quality* 1,508
Intercept	0.040***	0.041***	0.044***	0.036***
	(<0.001)	(<0.001)	(<0.001)	(<0.001)
ABS_UE (A)	0.069	0.115	0.329**	0.251*
	(0.156)	(0.318)	(0.021)	(0.100)
CORR	-0.004*	-0.004	-0.007*	-0.010**
	(0.094)	(0.105)	(0.074)	(0.006)
Size (A)	-0.0001	0.0001	-0.001	0.0002
	(0.676)	(0.835)	(0.335)	(0.565)
Size (NA)	-0.002***	-0.002***	-0.002***	-0.002***
	(<0.001)	(<0.001)	(<0.001)	(<0.001)
Qtr4	-0.001	-0.001	0.0001	-0.0004
	(0.281)	(0.113)	(0.950)	(0.973)
Herfindahl Index	0.002	0.001	0.003	0.002
	(0.497)	(0.711)	(0.541)	(0.591)
EQ	0.00001	0.001	-0.043***	-0.003
	(0.755)	(0.534)	(0.008)	(0.919)
ABS_UE(A)×EQ	0.017**	0.902**	0.486	7.961
	(0.007)	(0.038)	(0.927)	(0.412)
Year and industry dummies	*Yes*	*Yes*	*Yes*	*Yes*
Adj. R-square (%)	4.70	4.89	6.05	4.12

V. Discussion and Conclusion

It is puzzling why the incremental impact of earnings quality on the magnitude of information transfers is only found for market-based measures but not for accrual-based measures. I conjecture that one possible explanation is that a firm's historical pattern of estimating accruals, either the mapping from accruals to operating cash flows or the abnormal accruals, has already been incorporated into market expectations, and thus an earnings surprise of a high accrual quality firm may be essentially the same relative to an earnings surprise of a low accrual quality firm, and, thus, no differential information transfer is observed empirically. Such an explanation hinges on the fact that the accrual-based earnings quality measures are constructed over a long period of time, which allows the market to learn the accrual pattern of a firm and adjust its expectation. On the other hand, market-based measures are derived based on the relationship between stock returns and accounting earnings. In essence, stock returns reflect the market's adjustment of its perception of all the value-relevant information of one firm in a particular period, and clearly, this adjustment is done based upon a prior expectation that has already taken a firm's accrual pattern into consideration. Therefore, when the investors historically respond more to a firm's reported earnings or a firm's earnings numbers are historically more closely associated with its stock returns, it is reasonable to expect a greater information content of this firm's concurrent earnings announcement, and in turn, a greater information transfer to other non-announcing firms in the same industry.

To test the validity of my conjecture, I conduct the following event study, in which the announcing firm's 2-day CARs, *ABS_CARs(A)* is regressed on its unexpected earnings, *ABS_UE(A)* and an interaction term between the unexpected earnings and this firm's earnings quality measure, *ABS_UE(A)* × *EQ(A)*, in Eq. (8).

$$ABS\_CARs(A)_{j,t,q} = \beta_0 + \beta_1 ABS\_UE(A)_{i,t,q} + \beta_2 ABS\_UE(A)_{i,t,q} \times EQ(A)_{i,t,q-1} + \varepsilon \quad (8)$$

The test is done separately for all four earnings quality measures. If my conjecture is true, I expect to observe an incremental market reaction to the earnings surprise of a firm with high market-based earnings quality, and there should be no statistical significance between the market reaction for earnings surprise of a firm with high accrual-based earnings quality and that for earnings surprise of a firm with low accrual-based earnings quality. Table 7 confirms my conjecture. In particular, it shows that historical abnormal accruals or accrual quality does not incrementally affect the market's update of its

earnings expectation, but the historical market-based measures do. Therefore, given the fact that the historical accrual-based earnings quality does not induce different market reaction to earnings surprises, it is not surprising that the accrual-based earnings quality does not play a role in information transfers either. Of course, alternative explanations are not ruled out. For example, a quarterly instead of an annual earnings announcement setting is used in this study, since the quarterly earnings announcements are more timely and informative than are annual earnings announcements and, therefore, help to increase the power of the test in the information transfers study. [16] However, a trade-off necessarily arises in which the quarterly accruals estimations are subject to a greater number of estimating errors than would be the annual accruals estimations due to the integral principle for interim financial statements in which firms may assign estimated expenses to parts of a year. As a result, this trade-off may make the inference less accurate and must be taken into account when evaluating the study's conclusions.

Overall, this study investigates whether those announcing firms with higher earnings quality result in a larger magnitude of information transfers than do those firms with lower earnings quality surrounding quarterly earnings announcements. I identify four earnings quality measures, ERC, value-relevance, abnormal accruals, and accrual quality, and classify ERC and value-relevance measures as market-based and abnormal accruals and accrual quality as accrual-based. Prior research suggests that earnings of higher quality better reflect the operating fundamentals of a firm and thus reinforce the pricing effects of that firm. Within this context, I expect earnings of higher quality may contain information of higher quality regarding a firm's valuation on the industry level as well as on the firm-specific level and, therefore, reinforce the pricing effects on non-announcing firms within the same industry.

The empirical result suggests that the positive incremental impact of earnings quality on the magnitude of information transfers takes place when the market-based, but not the accrual-based, earnings quality measures are used. The finding that the association between announcers' earnings quality and the magnitude of information transfers varies systematically across the measures of earnings quality is possibly explained by the fact that the market incorporates the market-based perspective earnings quality and accrual-based perspective earnings quality differently. Specifically, the historical abnormal accruals and accrual quality have been incorporated into earnings expectation *ex ante*, and investors have already undone earnings management or considered the coarse accrual-

[16] I also use the annual earnings announcement setting and an overall finding of no information transfers. This might explain why most information transfer studies use a quarterly earnings announcement setting. Pownall and Waymire (1989) is an exception.

CFO mapping; therefore, the accrual-based measures do not affect the pricing effects of both announcing and non-announcing firms.

In summary, I demonstrate that an exploration of the effect of earnings quality on information transfers contributes to our understanding of how information transfers take place and of different measures of earnings quality.

Table 7 Regression Estimations of the Announcing Firm's Two-day CARs on its Unexpected Earnings and an Interaction Term between the Unexpected Earnings and the Earnings Quality Measure

Subsample	*ERC*	*Value Relevance*	*Abnormal Accruals*	*Accrual Quality*
Number of Observations	2,491	2,742	1,263	1,571
Dep. Variable: *ABS_CARs* (*A*)				
Intercept	0.031***	0.033***	0.031***	0.032***
	(<0.001)	(<0.001)	(<0.001)	(<0.001)
ABS_UE (*A*)	0.104***	0.106***	0.175***	0.097
	(0.002)	(0.018)	(0.016)	(0.121)
ABS_UE (*A*)×*EQ*(*A*)	0.141***	3.472***	-1.395	14.248
	(<0.001)	(<0.001)	(0.870)	(0.116)
Adj. R-square (%)	1.86	0.77	0.55	0.10

1. The table reports the results of OLS regressions of an announcing firm's two-day cumulative abnormal returns on its unexpected earnings and an interaction term between unexpected earnings and the earnings quality measure.
2. The sample period is 1995/1-2006/4 and the sample consists of the five firms with the largest sales in each industry and requires that the total sales of these five firms account for at least 50% of the total industry sales. The industry classification is based on the 3-digit SIC code, and financial firms (SIC 6000-6999) and utilities (SIC 4900-4999) are removed.
3. The subsample requires the data availability for calculating each earnings quality measure and the size of each subsample is specified as following.
4. ***, **, and * signify significance at 1%, 5%, and 10% levels.
5. All the variables are defined in Appendix. Figures in parentheses are the p-value.

$$ABS\_CARs(A)_{j,t,q} = \beta_0 + \beta_1 ABS\_UE(A)_{i,t,q} + \beta_2 ABS\_UE(A)_{i,t,q} \times EQ(A)_{i,t,q-1} + \varepsilon \quad (8)$$

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Appendix Variable Definition

Variable	Definition
Size (A)	The natural log of the capitalized value of the announcing firms in the end of quarter q of year t.
Size (NA)	The natural log of the capitalized value of the equally-weighted portfolio of the non-announcing firms in the end of quarter q of year t.
UE (A)	The unexpected component of the announcing firms' earnings in quarter q of year t, defined as the difference between the actual earnings and the median of analysts' most recent earnings forecasts made no earlier than 90 days prior to the earnings announcement, scaled by the stock price at the beginning of quarter q of year t.
ABS_UE (A)	The absolute value of the unexpected component of the announcing firms' earnings in quarter q of year t, defined as the difference between the actual earnings and the median of analysts' most recent earnings forecasts made no earlier than 90 days prior to the earnings announcement, scaled by the stock price at the beginning of quarter q of year t.
CARs (A)	The cumulative value-weighted abnormal returns in quarter q of year t for an announcing firm over the two-day window (-1, 0) on the earnings announcement date.
ABS_CARs (A)	The absolute value of the cumulative value-weighted abnormal returns in quarter q of year t for an announcing firm over the two-day window (-1, 0) on the earnings announcement date.
CARs (NA)	The average cumulative value-weighted abnormal returns in quarter q of year t for an equally-weighted portfolio of non-announcing firms over the two-day window (-1,0) on the earnings announcement date of an announcing firm which has the same 3-digit SIC code.
ABS_CARs (NA)	The absolute value of the average cumulative value-weighted abnormal returns in quarter q of year t for an equally-weighted portfolio of non-announcing firms over the two-day window (-1,0) on the earnings announcement date of an announcing firm which has the same 3-digit SIC code.

Appendix Variable Definition(Continued)

Variable	Definition
CORR	The average correlation among the daily returns of an announcing firm and of non-announcing firms in the prior year for each 3-digit SIC code industry.
Qtr4	An indicator variable for the fourth fiscal quarter.
Herfindahl Index	The sum of the squares of market shares of each firm in the same 3-digit SIC code industry for each industry-quarter.
N	The number of firms (one announcing firm plus non-announcing firms) in the same 3-digit SIC code industry for each industry-quarter announcement.
EQ (ABS_ERC)	The absolute value of the coefficient from a regression of the cumulative abnormal returns surrounding the earnings announcement for firm i, measured over a two-day window(-1,0), where the abnormal returns are based on the value-weighted market model, on the unexpected quarterly earnings for firm i at the earnings announcement date, scaled by the price as the end of the quarter for which earnings are announced, using the 12 most recent quarters that have non-missing data for returns and analyst forecast errors. A higher value indicates a greater level of high earnings quality.
EQ (VR)	The adjusted R^2 from a regression of the three-month holding returns ending in the end of the quarter on the level of earnings and the change of earnings for firm i, using the 12 most recent quarters that have non-missing data for returns and earnings. A higher value indicates a greater level of high earnings quality.
EQ (ABS_Accruals)	The average absolute value of the abnormal accruals estimated from the modified Jones model, using the 12 most recent quarters that have non-missing data for estimating. A higher value indicates a greater level of low earnings quality.
EQ (AQ)	The standard deviation of the residuals estimated from the modified Dechow and Dichev (2002) model, using the 12 most recent quarters that have non-missing data for estimating. A higher value indicates a greater level of low earnings quality.

"A" indicates announcing firms and "NA" indicates non-announcing firms.