

The Influence of Analysts, Institutional Investors and Insiders on the Incorporation  
of Market, Industry and Firm-Specific Information into Stock Prices

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# The Influence of Analysts, Institutional Investors, and Insiders on the Incorporation of Market, Industry, and Firm-Specific Information into Stock Prices

## Abstract

This paper investigates the extent to which the trading and trade-generating activities of three informed market participants - financial analysts, institutional investors and insiders – influence the relative amount of firm-specific, industry-level and market-level information being impounded into stock prices, as measured by stock return synchronicity. We find that stock return synchronicity is positively associated with analyst forecasting activities, consistent with analysts increasing the amount of industry level information in prices through intra-industry information transfers. In contrast, stock return synchronicity is inversely associated with institutional and insider trades, consistent with these transactions conveying firm-specific information. Supplemental tests show that insider and institutional trading accelerates the incorporation of the firm-specific component of future earnings news into prices alone, while analyst forecasting activity accelerates both the industry and firm-specific component of future earnings news. Together, the results suggest that all three parties influence the firm's information environment, but the type of price-relevant information conveyed by their activities is a function of each party's relative information advantage.

*J.E.L. Classification:* G14

*Key Words:* Stock return synchronicity, Insider Trading, Institutional Ownership, Financial Analysts

## 1. Introduction

An individual firm's stock price reflects market-level, industry-level and firm-specific information. As shown in King [1966], stock prices co-vary with market and industry returns; however, Roll [1988] observes that a significant portion of stock return variation is *not* attributable to general market and industry movements and suggests that these residual movements represent the impounding of firm-specific information into prices. Despite these conclusions, little research has attempted to examine why some firms exhibit more stock return synchronicity than others in the U.S. market. We address this issue by investigating the extent to which the trading (and trade generating) activities of three informed market participants – insiders, institutional investors and financial analysts - influence the *relative amount* of firm-specific, industry-level and market-level information being impounded into stock prices, as measured by stock return synchronicity. To the extent that these three informed parties contribute different information into the price formation process or differentially influence the dissemination and incorporation of common (i.e., industry and market) information, stock return synchronicity should systematically vary with the presence or absence of these parties' activities. Because some parties may have greater access to firm-level or industry-level information, the sign of each party's relation with stock return synchronicity is expected to be a function of their relative advantage with respect to obtaining and interpreting market-wide, industry-level and firm-specific information.

The actions of insiders, institutional investors and financial analysts generate a *continuum* of informed trade that influences stock prices. By definition, insiders (i.e., the executives and directors of the firm) are the most informed party with respect to the firm's operations, risks and opportunities. Given the insider's firm-level information advantage, the link between insider trading activities and the flow of firm-specific information into prices is the most direct. For example, Manne [1966a; 1966b] suggests that management can communicate their private information to market participants through their trading behavior. Subsequent research supports the conclusion that insider trades

reveal private, firm-specific information not impounded in price (e.g., Seyhun, 1992; 1998; Meulbroek, 1992; Damadoran and Liu, 1993; Huddart, Ke and Petroni, 2003; Piotroski and Roulstone, 2003). To the extent that these trading activities do not crowd out the trading behavior of other market participants, greater insider trading activity should improve the informational efficiency of a firm's stock price with respect to firm-specific information, reducing stock return synchronicity.

In contrast, institutional investors can be either quasi-insiders or outsiders depending on their ownership stake and long-term trading behavior (e.g., Bushee, 1998). To the extent that institutional investment decisions are influenced by private information, changes in their holdings will convey information. The type of information possessed by institutions and conveyed by their trades should be a function of their pre-trade ownership stake, trade size and investment style. Specifically, dedicated institutional ownership should be associated with greater monitoring and increased access to firm-specific information, *ceteris paribus*. In contrast, some institutions are passive investors (e.g., index or sector funds), whose trades are dictated by portfolio rebalancing and liquidity considerations. Since the type of information conveyed by their trades is unclear, the expected general relation between institutional trades and synchronicity is ambiguous.

Finally, financial analysts are outsiders. The average analyst is expected to have less access to firm-level information than management or significant institutional investors. As such, analysts could focus their efforts on obtaining and mapping industry and market-level information into prices. Evidence suggests such industry-level preferences exist. For example, Clement [1999] and Jacob, Lys and Neale [1999] show that analyst accuracy improves with industry specialization, while Gilson, Healy, Noe and Palepu [2001] show that the composition of analyst coverage changes after spin-offs and equity carve-outs. Together, these results suggest that an analyst's comparative advantage rests in the interpretation of specific industry or market sector trends and improving intra-industry information transfers. Unlike institutions and insiders, analysts convey their private information through firm-specific earnings forecasts and stock recommendations. Moreover, the

analyst can improve the efficiency of prices not just through their firm-specific forecast, but by also identifying the common industry component of each firm's news event and disseminating this information into the price formation process of all covered firms. Because analyst forecasts and subsequent revisions induce price-relevant trades (e.g., Givoly and Lakonishok, 1979; Lys and Sohn, 1990; Park and Stice, 2000), their forecasting activities should cause prices to reflect this additional industry and market-level information, resulting in greater stock return synchronicity.

Although existing research documents an informational role for each of these three parties, the extent to which their activities differentially influence the impounding of market, industry and firm-level information into prices remains unknown. We examine whether stock return synchronicity varies by the activities of these three parties, and predict that the relation will reflect each party's relative access to firm-specific information. Consistent with prior research (King, 1966; Roll 1998; Morck, Yeung and Yu, 2000), stock return synchronicity is defined as the extent to which firm-level stock returns are explained by market and industry returns. The strength of this approach is that stock return synchronicity reflects the *relative amount* of firm-specific versus industry and market-level information influencing prices over the fiscal year, including information not reflected in near-term earnings. In this framework, firms displaying low (high) stock return synchronicity, *ceteris paribus*, have a relatively greater amount of firm-specific (market and industry-level) information being impounded into prices. Thus, we expect prices to be less (more) synchronous, i.e., reflect more firm-specific (industry-level) information, in the presence of greater insider (outsider) trading activities.

We find that stock return synchronicity is positively associated with analyst activity, consistent with analysts increasing the relative amount of market and industry-level information reflected in security prices (i.e., the *net* effect of their activity is to improve the incorporation of industry-level information into prices). Effectively, analyst activity acts as a conduit through which intra-industry transfers of information occur, leading to prices that exhibit greater co-movement.

Conversely, we find that stock return synchronicity is inversely associated with greater levels of insider trading and larger changes in institutional holdings (i.e., the net contribution of these trading activities is to increase the relative amount of firm-specific information influencing prices). Finally, the level of institutional holdings displays a relation similar to analysts, suggesting that the presence of significant institutional ownership also facilitates intra-industry information transfers. Together, the results are consistent with all three parties influencing the informational efficiency of equity prices, but the type of price-relevant information conveyed by their activities appears to be a function of each party's relative informational advantage and ability to disseminate common industry-level information across firms.

Lastly, to discriminate between two competing interpretations of low stock return synchronicity, namely, firm-specific information versus noise, we examine the extent to which the industry and firm-specific components of next year's earnings innovation are reflected in current returns, conditional on the presence of these informed trading activities. This approach allows us to measure whether the activities of these informed parties differentially influence the *timing* of the incorporation of industry and firm-specific earnings components into prices. If stock return synchronicity is simply reflecting the level of noise trading, then these trading activities should not differentially impact the impounding of firm and industry earnings components into price. Consistent with the inferences obtained using stock return synchronicity, institutional and insider trading appears to accelerate the incorporation the firm-specific component of earnings into prices alone, while analyst forecasting activity appears to accelerate both industry and firm-specific earnings information.

Section 2 provides background information on stock return synchronicity and outlines the research design and variable definitions. Section 3 presents the main empirical results, while section 4 presents several extensions and interpretations of the primary results. Section 5 concludes.

## **2. Research design, variable definitions and data**

### ***2.1 Background on stock return synchronicity***

King [1966] documents that stock prices co-vary with both market and industry returns, consistent with the notion that individual firms are influenced by a common set of economic fundamentals. Building on this intuition, Ball and Brown [1967] document that a significant portion of a firm's annual earnings innovation can be explained by common market and industry-level earnings news. The amount of earnings news attributable to these common components is similar, in magnitude, to the fraction of stock returns that are explainable by common market and industry movements. Thus, variation in earnings is partially attributable to variation in industry and economy-wide earnings factors. Moreover, as discussed in Cyert [1967] and Williams [1967], the residual component of earnings (not explained by industry or market earnings) is likely to be a product of internal factors and events unique to the firm.

Consistent with these arguments, Roll [1988] notes the low association between individual firms' stock returns and market and industry stock price movements. Roll suggests that this weak association (i.e., low stock return synchronicity) is the result of firm-specific information being impounded into individual stock prices. Specifically, *ceteris paribus*, the ability of industry and market returns to explain variation in firm-level returns will decline as relatively more firm-specific information is incorporated into the firm's stock price. However, Roll also notes that low stock return synchronicity could be an artifact of noise traders introducing volatility into prices.

Several recent papers provide empirical support for Roll's firm-specific information (relative to market and industry information) interpretation of low stock return synchronicity. Morck, Yeung and Yu [2000] examine cross-country differences in stock return synchronicity and find an inverse relation between synchronicity and government protection of property rights. This inverse relation is consistent with Roll's explanation because a low respect for property rights is likely to impede firm-specific informed trading activities. Building on Morck Yeung and Yu's findings, Wurgler [2000]

tests whether countries with stock markets possessing more informative prices allocate resources more efficiently. Consistent with informed prices aiding the flow of capital across sectors, Wurgler documents an inverse relation between the elasticity of industry investments and stock return synchronicity. Similarly, Durnev, Morck and Yeung [2002] show that firm-specific return variation is associated with efficient capital allocation (at the firm level). Because a stronger flow of firm-specific information should allow for greater monitoring and reduced information asymmetry between insiders and outsiders, the observed relations between low synchronicity and efficient capital allocation decisions indirectly supports the interpretation that synchronicity reflects the flow of firm-specific information. DeFond and Hung [2003] show that the association between lagged stock returns (lagged earnings) and subsequent CEO turnover is stronger in countries with low (high) stock return synchronicity, consistent with investors using external, observable stock prices for governance purposes when returns reliably reflect firm-specific performance. Together, these cross-country studies use stock return synchronicity as a proxy for informed prices, and document market behavior that jointly validates their interpretation of synchronicity.

Finally, using a sample of U.S. firms, Durnev, Morck, Yeung and Zarowin [2002] document that firm-level synchronicity measures are negatively associated with how well prices lead earnings realizations. Using Collins, Kothari, Shanken and Sloan's [1994] incremental  $R^2$  metric of stock price informativeness, Durnev et al. find that the extent to which prices reflect a greater level of current and future earnings information is positively related to the amount of firm-specific information being impounded in price (i.e., low synchronicity).

By construction, stock return synchronicity measures the ability of industry and market returns to explain firm-level returns. The residual component of returns represents firm-specific information or idiosyncratic noise. Existing evidence suggests that stock return synchronicity is inversely related to the relative amount of firm-specific information influencing prices. Given this evidence, stock return synchronicity is a reasonable benchmark for measuring the *relative amount of*

firm-specific versus market and industry-level information influencing prices. However, this interpretation remains subjective. As such, this paper is effectively a joint test of (1) the firm-specific information interpretation of stock return synchronicity and (2) the type of information contributed by the trading and trade-generating activities of insiders, institutions and analysts.

## 2.2 Measurement of stock return synchronicity

Each calendar year, we estimate firm-specific measures of return synchronicity using the methodology outlined in Durnev, Morck, Yeung and Zarowin [2002]. Specifically, for each firm-year observation, we regress weekly returns on the current and prior week's value-weighted market return ( $MARET_{i,t}$ ) and the current and prior week's value-weighted two-digit SIC industry return, or:

$$RET_{i,t} = \alpha + \beta_1 MARET_{i,t-1} + \beta_2 MARET_{i,t} + \beta_3 INDRET_{i,t-1} + \beta_4 INDRET_{i,t} + \varepsilon_{i,t}. \quad [1]$$

The industry return ( $INDRET_{i,t}$ ) for a specific week  $t$  is created using all firms with the same two-digit SIC code, with firm  $i$ 's weekly return omitted.  $INDRET_{i,t}$  is the value-weighted average of these firms' week  $t$  returns. We include lag return metrics since the presence of informed parties can impact the timing of the market and industry information's incorporation into prices.<sup>1</sup> We estimate this regression for each firm-year with a minimum of 45 weekly observations, where a weekly return is defined as the compounded return over five consecutive trading days. All stock return data is gathered through CRSP. Following the definition in Morck, Yeung and Yu [2000], we define synchronicity as

$$SYNCH_{i,t} = \log\left(\frac{R^2}{1 - R^2}\right) \quad [2]$$

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<sup>1</sup> Failure to control for lag returns will cause our synchronicity measure to be influenced by both timing of information and amount of information effects. The inclusion of lags should mitigate timing of information incorporation issues, allowing us to focus strictly on whether firm-level returns are being influenced by industry and market news.

where  $R^2$  is the coefficient of determination from estimation of equation (1). The log transformation of  $R^2$  creates an unbounded continuous variable out of a variable originally bounded by 0 and 1, yielding a dependent variable with a more normal distribution. SYNCH is measured for each firm-year in the sample. By construction, high values of SYNCH indicate firms whose stock returns are closely tied to (i.e., vary strongly with) market and industry returns, and are assumed to reflect relatively less firm-specific information.

### ***2.3 Measurement of informed parties information dissemination activities, and their predicted relations with stock return synchronicity***

As discussed earlier, insiders can communicate their private information to market participants through their trading behavior. We measure this information flow using net insider trades during the calendar year ( $TRADE_{i,t}$ ). We define TRADE as the absolute value of the difference between the sum of total shares purchased and the total shares sold by insiders during the calendar year, scaled by total trading volume during the year. This metric assumes that the net direction of insider trades is informative and improves the efficiency of a firm's stock price. We gather data on insider transactions through Thomson Financial's Thomson/First Call Insiders Data Feed database.

Institutions can also communicate their private information through their trading behavior. We measure the intensity of institutional investor activity by the net change in institutional holdings ( $\Delta INST_{i,t}$ ) during the calendar year, scaled by total annual trading volume. Data on share ownership was obtained through the CDA/Spectrum database. If CDA/Spectrum does not report institutional holdings for firm  $i$  in year  $t$ , we assume that the fraction of shares held and traded by institutions is zero.<sup>2</sup>

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<sup>2</sup> For both insider and institutional trades, we are implicitly assuming that the other side of these net transactions involve a price-taking investor without private information.

Finally, analysts can disseminate their private information through their earnings forecasts, revisions and stock recommendations. We measure the intensity of analyst activity as the number of one-year ahead earnings forecasts issued and revised for the firm during a given fiscal year. We gather data on the number of analysts issuing forecasts and subsequent revisions ( $NREV_{i,t}$ ) through the I/B/E/S detail tape. If I/B/E/S does not report an analyst forecast for firm  $i$  in year  $t$ , we assume that the number of earnings forecasts issued and revised for that firm-year is zero.<sup>3</sup>

To the extent that insiders possess a competitive advantage with respect to firm-specific information, we expect the relation between TRADE and SYNCH to be negative. In contrast, an analyst's competitive advantage rests at the industry level. If their earnings forecasts and revisions reflect this advantage, then we would expect to find a positive relation between NREV and SYNCH. Finally, the type of information advantage possessed by institutions is unclear. Institutions are sophisticated investors who can take significant positions in the firm, resulting in "inside access" to firm-level information; however, some institutions are transient investors, and their trading is more likely to be driven by liquidity needs or macro-economic trends. Given this variation across institutions, we make no predictions regarding the relation between  $\Delta INST$  and SYNCH.

### **3. Empirical results**

#### ***3.1 Descriptive statistics***

Table 1 presents descriptive statistics about the firm-year observations included in our sample. In general, the firms display considerable cross-sectional variation in size (average MVE of \$1,436M; median MVE \$106M) and financial performance (mean and median ROA of  $-0.019$  and  $0.029$ ; 29.1% of the firms report a loss). In terms of the presence of informed trading and trade-inducing activities, several trends are apparent. First, 63.8 % and 35.5% of the firm-years in the

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<sup>3</sup> These specific channels of communication do not preclude these parties from using other methods of disseminating information to the markets. For example, institutional investors can issue stock recommendations on their firms

sample do not have analyst coverage or institutional ownership, respectively. Given this large proportion of “zero” observations, the tests in this paper are performed both with and without these observations; any differences in inferences are noted in the text. Second, the level of analyst coverage and institutional ownership displays considerable cross-sectional variation in this sample. Third, insider trading appears to be a prevalent phenomenon, with 58.7% of the firms having some form of insider transactions during the fiscal year.

Consistent with the weak associations documented in the prior literature, the average and median  $R^2$ 's from the estimations of equation [1] are 0.192 and 0.147, respectively. However, despite the low average and median levels, these  $R^2$ 's (and the related synchronicity metric) display considerable cross-sectional variation. Over this time period, the top quarter of the sample had  $R^2$ 's in excess of 25.9%, while the bottom quartile possessed  $R^2$ 's less than 8.0%. Given that these measures are calculated within U.S. markets, traditional differences documented at the country level (e.g., protection of property rights, efficiency of the judicial system, role of banks versus markets, etc.) are not likely the cause of observed differences in synchronicity. Instead, differences in  $R^2$ 's are a result of the economics underlying each firm and the relative flow of information into prices.

Table 2 presents the matrix of correlations among informed market participants' activity, firm-specific characteristics and stock return synchronicity. Several key relations are apparent. First, analyst revisions and changes in institutional ownership display a positive correlation. Second, the Pearson correlations between TRADE and NREV ( $\Delta$ INST) are negative (positive) while both Spearman correlations are significantly positive. After removing firms with no analyst coverage and institutional ownership, we find a strong inverse relation between TRADE and NREV while TRADE continues to have a small positive correlation with  $\Delta$ INST [not tabulated]. Third, both analyst forecast activity and changes in institutional ownership display a significant positive association with stock return synchronicity while insider trading has a negative (positive) Pearson (Spearman)

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while managers can convey private information through voluntary disclosure mechanisms.

correlation. When firms with no analyst coverage or institutional ownership are removed, the positive correlations between SYNCH and these two parties (NREV and  $\Delta$ INST) become stronger, while the relation between SYNCH and TRADE becomes significantly negative (Spearman correlation of -0.23). The correlation pattern across informed trader types is consistent with the extent to which these parties are exposed to internal, firm-specific information; however, these relations should be viewed with caution since they do not control for differences in each firm's operations.

### ***3.2 Impact of informed market participants on the relative amount of market-level, industry-level and firm-specific information in prices***

To test whether analyst forecasting activity, changes in institutional ownership and insider trading activity influence the relative flow of firm-specific, industry and market information into prices, we annually estimate the following cross-sectional model:

$$\text{SYNCH}_{i,t} = \alpha_1 + \alpha_2 I + \alpha_3 \text{REG} + \beta_1 \log(\text{NREV}_{i,t}) + \beta_2 \log(\Delta \text{INST}_{i,t}) + \beta_3 \log(\text{TRADE}_{i,t}) + \beta_4 \text{STDROA}_{i,t} + \beta_5 \text{DIVERS}_{i,t} + \beta_6 \text{FUNDCORR}_{i,t} + \beta_7 \log(\text{IHERF}_{i,t}) + \beta_8 \log(\text{NIND}_{i,t}) + \beta_9 \log(\text{MVE}_{i,t}) + \epsilon_{i,t} \quad [3]$$

Stock return synchronicity is principally affected by the underlying economics of the firm and its industry. To control for these cross-sectional differences, our model includes variables measuring the diversification of the firm (DIVERS), the correlation of the firm's earnings with industry-level earnings (FUNDCORR), the industry-level concentration (i.e., Herfindahl index) of the firm's primary business (HERF), the volatility of the firm's earnings stream (STDROA), whether the firm operates in a regulated industry (REG), firm size (MVE), and the number of firms in the industry (NIND).

The more diverse the firm's underlying operations are, the less likely consolidated profitability will track the performance of its primary industry affiliation. Moreover, diversified firms may be less sensitive to macro-economic shifts. We measure how diversified the firm is by

looking at the concentration of its revenue streams. We define diversification (DIVERS) using a firm-specific Herfindahl ratio, where sales are measured using reported business segment-level revenue data. We expect DIVERS, as defined, to display a positive relation with SYNCH.

The more correlated the firm's profitability is with the underlying industry's performance, the more synchronized the firm's stock price should be to industry returns. Our measure of this correlation in fundamentals, FUNDCORR, is calculated in a manner analogous to SYNCH. In lieu of stock returns, we estimate the ability of a value-weighted industry ROA to explain firm-level ROA realizations. Using quarterly data, we estimate this ROA model using the proceeding three years of data, giving us a maximum of twelve observations per firm-specific regression. We expect FUNDCORR to display a positive relation with SYNCH.

The structure of the industry should influence the amount of synchronicity observed in returns. The more concentrated an industry is, the more likely the firms' performances are interdependent, where news about one firm is likely to be perceived as value-relevant for the remaining firms (e.g., oligopoly versus perfectly competitive market). Similarly, an obvious market leader could act as a leading indicator for smaller firms; in such a setting, all firm returns are likely to be synchronized to the leader's returns due to the intra-industry transfer of information. We measure industry concentration (HERF) as the two-digit SIC code industry's Herfindahl index for the year. In both cases, we expect HERF to display a positive relation with SYNCH.

As the volatility of the firm's profitability increases, it is less likely firm-level performance will be correlated with overall industry or market trends. We measure earnings volatility as the standard deviation of quarterly return on assets (STDROA), measured over three years including and preceding year  $t$ . Each quarter's return on assets is measured as income before extraordinary items scaled by average total assets. We expect STDROA to display an inverse relation with SYNCH.

All firms in a regulated industry are subject to common constraints on their operations. As such, the equity values of these firms should respond similarly to changes in underlying regulations

and economic conditions. The indicator variable REG equals one if the firm operates in the following 2-digit SIC code industries: 62 (financial institutions) and 49 (utilities). We expect a positive relation between REG and SYNCH.

Finally, we include firm size to control for omitted firm-specific factors. For example, firm size is positively associated with various dimensions of the firm's information environment, including media exposure and overall level of investor interest. Differences in information environment could influence stock return synchronicity. Alternatively, large firms could represent leading market indicators. To the extent that these large firms reveal or signal macro-economic trends, their price behavior is likely to induce similar overall market movements, resulting in heightened stock return synchronicity. We proxy for firm size with the natural logarithm of the market value of equity (MVE). We make no prediction of the sign of the relation between MVE and SYNCH.<sup>4</sup>

Table 4 presents the average coefficients from 17 annual OLS estimations of equation [3]. These average coefficients are tested against the null of zero using standard errors derived from the empirical distribution of annual coefficients. To control for industry effects, we include one-digit SIC code ( $I_{i,t}$ ) indicator variables in all models.<sup>5</sup> To control for skewness in the data, we take the logarithm of the independent variables, where appropriate. Appendix 1 summarizes the dependent and independent variables and their definitions.

As expected, diversified firms and firms with volatile earnings have less synchronous stock prices, while firms whose fundamentals are highly correlated with their industry's performance possess more synchronous stock prices. In terms of industry affiliation, firms operating in concentrated and regulated industries have more synchronous prices. Finally, the returns of large

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<sup>4</sup> We also include the average number of firms in the industry (NIND) used to create the weekly industry index return as a control variable (see Durnev, Morck, Yeung and Zarowin, 2002). NIND is expected to control for any differences in r-squares arising from differences in sample size used for estimation purposes.

<sup>5</sup> Fixed effects associated with industries 0 and 9 are captured in the intercept.

firms are highly synchronized with market and industry returns, consistent with these firms acting as a leading indicator of economy-wide and industry-level trends. Together, the observed relations are intuitive and consistent with prior literature, suggesting that our measure of stock return synchronicity is properly estimated.

Focusing on the activities of informed market participants, we find that stock return synchronicity is significantly negatively related to insider-trading activity (TRADE) and institutional trading ( $\Delta INST$ ). The negative relations suggest that the net effect of institutional and insider transactions is to increase the relative flow of firm-specific information into prices, consistent with their relative information advantage. In contrast, stock return synchronicity displays a significant positive association with the level of analyst activity (estimation [2]). The positive association suggests a greater portion of stock return variability is explained by market and industry returns as the level of analyst activity increases, consistent with analysts contributing industry or market-level expertise to the price formation process. Effectively, analyst activities improve intra-industry information transfers, resulting in greater price co-movement. Finally, these individual relations hold if all three informed parties are included in the same annual estimation (estimation [5]).

### ***3.3 Relation between informed parties' trading activities and stock return synchronicity:***

#### ***Simultaneous estimation procedures***

Analyst activities, institutional ownership and insider trading are influenced by the economic characteristics of the firm, including the extant information environment and firm's financial performance and risk characteristics. For example, analysts could self-select the firms they cover based on industry affiliations, choosing to follow those firms that are market leaders and/or have strong similarities to the set of firms already covered. Similarly, insiders may be more inclined to sell their shares if their firm's stock displays excessive idiosyncratic risk (i.e., low stock return

synchronicity). Given the potential for endogeneity between the activities of these three parties and stock return synchronicity, we estimate the following three systems of simultaneous equations in an effort to understand the nature of the observed relations:

#### Analyst Revisions:

$$\begin{aligned} \text{SYNCH}_{i,t} &= \alpha_1 + \alpha_2 I + \alpha_4 \text{REG} + \beta_1 \log(\text{NREV}_{i,t}) + \beta_2 \text{STDROA}_{i,t} + \beta_3 \text{DIVERS}_{i,t} + \beta_4 \text{FUNDCORR}_{i,t} + \beta_5 \log(\text{HERF}_{i,t}) + \beta_6 \log(\text{NIND}_{i,t}) + \beta_7 \log(\text{MVE}_{i,t}) + \varepsilon_{i,t} \\ \log(\text{NREV}_{i,t}) &= \alpha_1 + \alpha_2 \text{REG}_{i,t} + \beta_1 \log(\text{MVE}_{i,t}) + \beta_2 \text{ROA}_{i,t} + \beta_3 \log(\text{SHRTURN}_{i,t}) + \beta_4 \text{STDROA}_{i,t} + \beta_5 \text{SYNCH}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad [4]$$

#### Institutional Trading:

$$\begin{aligned} \text{SYNCH}_{i,t} &= \alpha_1 + \alpha_2 I + \alpha_4 \text{REG} + \beta_1 \log(\Delta \text{INST}_{i,t}) + \beta_2 \text{STDROA}_{i,t} + \beta_3 \text{DIVERS}_{i,t} + \beta_4 \text{FUNDCORR}_{i,t} + \beta_5 \log(\text{HERF}_{i,t}) + \beta_6 \log(\text{NIND}_{i,t}) + \beta_7 \log(\text{MVE}_{i,t}) + \varepsilon_{i,t} \\ \log(\Delta \text{INST}_{i,t}) &= \alpha_1 + \alpha_2 \text{REG}_{i,t} + \beta_1 \log(\text{MVE}_{i,t}) + \beta_2 \log(\text{MB}_{i,t}) + \beta_3 \log(\text{SHRTURN}_{i,t}) + \beta_4 \text{abs}(\text{RET}_{i,t-1}) + \beta_5 \text{abs}(\Delta \text{ROA}_{i,t+1}) + \beta_6 \text{SYNCH}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad [5]$$

#### Insider Trading:

$$\begin{aligned} \text{SYNCH}_{i,t} &= \alpha_1 + \alpha_2 I + \alpha_4 \text{REG} + \beta_1 \log(\text{TRADE}_{i,t}) + \beta_2 \text{STDROA}_{i,t} + \beta_3 \text{DIVERS}_{i,t} + \beta_4 \text{FUNDCORR}_{i,t} + \beta_5 \log(\text{HERF}_{i,t}) + \beta_6 \log(\text{NIND}_{i,t}) + \beta_7 \log(\text{MVE}_{i,t}) + \varepsilon_{i,t} \\ \log(\text{TRADE}_{i,t}) &= \alpha_1 + \alpha_2 \text{REG}_{i,t} + \beta_1 \log(\text{MVE}_{i,t}) + \beta_2 \log(\text{MB}_{i,t}) + \beta_3 \log(\text{SHRTURN}_{i,t}) + \beta_4 \text{abs}(\text{RET}_{i,t-1}) + \beta_5 \text{abs}(\Delta \text{ROA}_{i,t+1}) + \beta_6 \text{SYNCH}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad [6]$$

Each system models the simultaneous relation between the activity of one informed party and stock return synchronicity individually. Due to the difficulty associated with identifying unique instruments for each informed trading activity, these models are not estimated as a complete system of four equations.

The variables chosen for the informed-party models are identified from existing research, wherever possible (e.g., Lang and Lundholm, 1996; Stickel, 1998; Rozeff and Zaman, 1998). However, research on institutional trading volume and insider trading volume (i.e., unsigned trades) is scarce. As such, we have incorporated versions of variables that are shown to influence trading volume in general, insider transactions and institutional transactions. In these models, ROA is the current year's return on assets, defined as net income before extraordinary items scaled by average total assets,  $\text{abs}(\Delta \text{ROA})$  is the absolute change in the current year's return-on-assets, MB is the firm's market-to-book ratio,  $\text{abs}(\text{RET})$  is the firm's absolute market-adjusted return for the preceding year and SHRTURN is the current year's trading volume scaled by shares outstanding. All other variables are as previously defined. These systems are estimated annually using two-stage least

squares. Table 5 reports average coefficients and time-series t-statistics from seventeen annual estimations.

Consistent with prior research on analyst following, NREV is positively related to firm size, share turnover and profitability, and negatively related to the variability of earnings. In terms of insider and institutional trading, both of these transactions are positively related to the firm's market-to-book ratio, and inversely related to the magnitude of contemporaneous earnings change and share turnover. Insider trades display a marginally significant association with the magnitude of the preceding year's stock return. In terms of explanatory power, our first-stage NREV models have an average  $R^2$  of 20.4%; however, our instruments do a relatively poorer job at explaining changes in institutional holdings and net insider trades, where the average first stage  $R^2$ 's are 9.81% and 1.71%, respectively.

The extant literature does not provide conclusive evidence regarding whether a firm's information environment induces greater analyst following or whether analyst activity leads to an improvement in information environment.<sup>6</sup> Our specification is designed to control for the potential simultaneity that can exist between these two constructs, yet causality still needs to be inferred cautiously. Based on the annual estimations of the NREV and  $\Delta$ INST models, our evidence suggests that analysts and institutions are more active in firms whose stock prices are more synchronous with industry and market returns. In contrast, insiders appear to (marginally) prefer to trade in firms whose prices contain large amounts of firm-specific information. This is consistent with insiders trading in firms where their advantage in firm-specific information is most value-relevant and least likely to have been arbitrated away (see Mendenhall, 2002), as well as having the greatest incentive to trade to eliminate the amount of idiosyncratic risk they are exposed to.

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<sup>6</sup> For example, Lang and Lundholm [1996] find a positive relation between analyst following and AIMR scores, while Healy, Hutton and Palepu [1999] find evidence that an improvement in disclosure policy attracts analysts.

After controlling for the effects of simultaneity, our synchronicity models confirm the primary OLS results: Stock return synchronicity is positively associated with analyst activity, and negatively associated with institutional and insider trading. Together, the evidence in tables 3 and 4 suggest that analyst activities cause prices to synchronize with industry and market-level movements. This positive relation is particularly compelling since trading by institutions and insiders displays significant negative relations with stock return synchronicity, consistent with managers' and institutional owners' greater relative access to internal, firm-specific sources of information.

### ***3.3 Robustness tests***

#### *3.3.1 Elimination of observations without informed trading activity*

A potential concern is that our estimations are being unduly influenced by the presence of zero observations for NREV,  $\Delta$ INST and TRADE. Estimations excluding zero observations reveal several important results [not tabulated]. First, the significant individual relations between synchronicity and the activities of analysts, institutions and insiders documented in Tables 3 are also found in a non-zero sub-sample of observations. However, the average annual coefficients on  $\log(\text{NREV})$ ,  $\log(\Delta\text{INST})$  and  $\log(\text{TRADES})$  are slightly smaller in magnitude than those reported in Tables 3. Second, the coefficient on TRADE becomes insignificantly negative in the joint estimation. Lastly, after controlling for simultaneity, the relations between synchronicity and the activities of the three parties are consistent those reported in Table 4. However, in terms of informed party activities, synchronicity no longer has explanatory power as a determinant of analyst following and institutional trading.

### *3.3.2 Measurement of informed insider transactions: Net trades versus purchases*

Our measure of insider transactions is based on net insider trades. However, many sales transactions are the results of liquidity demands and do not reflect the managers' private information. Furthermore, sales transactions may be mechanically associated with synchronicity if insiders sell their holdings when firm idiosyncratic risk increases, i.e., insiders diversify their portfolios in reaction to a decrease in stock return synchronicity. As a result, TRADE is a noisy proxy for the firm-specific information possessed by insiders and disseminated through their trades. By contrast, an open-market purchase is likely to be an information-driven transaction. If greater insider transactions increase the flow of firm-specific information into prices, then the observed synchronicity relations should be magnified using a purchase-based insider trading metric.

We measure insider buy transactions (PURCH) as total shares purchased by insiders during the calendar year, scaled by total trading volume during the year. We re-estimate our synchronicity models using this measure, and find that using PURCH in lieu of TRADE yields a stronger relation between insider trades and the flow of firm-specific information [results not tabulated].<sup>7</sup> The use of insider purchases confirms and strengthens our interpretation that the *net* effect of informed insider transactions is to increase the relative amount of firm-specific information included in the stock price formation process.

### *3.3.3 Measurement of industry and market returns and additional control variables*

To measure stock return synchronicity, we classify firms by their two-digit SIC code affiliation. For robustness, we have re-estimated our metrics and models using three-digit SIC codes and find similar results. Moreover, our results are robust to the use of equal-weighted market returns in lieu of value-weighted market returns to measure stock return synchronicity. We retain two-digit

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<sup>7</sup>Alternatively, the use of a sales-based insider trading metric in lieu of TRADE yields a weaker (yet still significant) relation between insider trades and the flow of firm specific information [results not tabulated].

SIC code industries and value-weighted returns to be consistent with Durnev, Morck, Yeung and Zarowin [2002].

For firms that are thinly traded, the measurement error in daily returns arising from the bid-ask bounce could result in low stock return synchronicity. The inclusion of the firm's share turnover ratio as an explanatory variable yields a significant positive relation with synchronicity, but does not alter the sign or magnitude of the observed relations between synchronicity and our three informed trade variables.

#### *3.3.4 Additional evidence on the role of institutions*

Tables 3 and 4 show that the relative amount of firm-specific information reflected in prices is positively related to the net number of shares traded by institutions during the fiscal year. This interpretation is consistent with large changes in ownership reflecting private, investment-specific information and small changes driven by liquidity or portfolio re-balancing pressures. However, institutional ownership is complex. Financial institutions, depending on their ownership share and investment styles, can act as either long-term dedicated owners or transient owners (Bushee, 1998; Hartzell and Starks, 2000; Ali, Durtschi, Lev and Trombley, 2002). The size and concentration of institutional holdings in a given company can have two effects on the flow of information. First, institutions taking larger positions have the ability to gain access to firm-level information, monitor management and influence managerial actions. In that setting, changes in institutional holdings are more likely to reflect their superior knowledge of firm-specific information. Second, significant institutional holdings are likely to be associated with the presence of long-term, dedicated owners. Long-term, dedicated holdings can arise if institutions follow an indexing or sector-based strategy. In terms of information effects, institutions following such an investment strategy will ultimately possess an industry and market-level information advantage similar to analysts; thus, the presence of

significant institutional ownership could actually lead to improved intra-industry information transfers, resulting in more synchronous price movements among the firms in the industry.

To explore the information effects of significant institutional ownership, we measure the aggregate percentage of shares outstanding held by institutions (INST) at the beginning of the fiscal year. Table 5 presents estimations of our synchronicity regressions after including the level of institutional ownership as both an additional explanatory variable and as a conditioning variable. The first column presents our basic results for changes in institutional shareholdings from Table 3; the remaining columns present estimations that incorporate INST in several different empirical configurations. As estimation [2] reveals, stock return synchronicity has a significant positive relation with the level of institutional holdings (INST). This relation is similar to the association observed between synchronicity and analyst activity, suggesting that the presence of significant institutional ownership facilitates intra-industry information transfers. However, unlike observable analyst forecasts and revisions, the mechanisms by which large institutions reveal industry-level information and influence prices (e.g., analyst comments, research reports) are not readily observable to outside investors.

The remaining two columns document that institutional trades and the level of institutional ownership have incremental explanatory power for stock return synchronicity. In terms of interactive effects, the price impact of institutional trades varies by their combined pre-trade ownership stake. Specifically, the firms-specific effects of institutional trades are strongest if pre-trade holdings are small. However, institutional trading seems to increase synchronicity as the combined, pre-trade ownership stake increases. This positive interaction term is consistent with trades leading to co-movement when the firm is entrenched within these institutional information-sharing networks and/or the trade is more likely to draw the attention of other institutional investors.

For completeness, we consider an alternative method of classifying financial institutions. Ali, Durtschi, Lev and Trombly [2002] and Hartzell and Starks [2000] separate institutions by type

(e.g., independent investment advisors, investment companies, bank trusts, etc) to examine the effect of institutional ownership on the amount of earnings information reflected in prices, and on corporate governance, respectively. We have split the sample by the type of institution and replicated all of our tests. We find no significant differences in our results when the sample is partitioned across institutional type.<sup>8</sup>

#### **4. Further evidence on whether analysts, institutions and insiders differentially influence the impounding of industry-level versus firm-specific information into prices**

Our interpretation of the results is predicated on the assumption that variation in stock return synchronicity reflects differences in the relative amounts of firm-specific and industry-level information influencing prices. Although existing research yields results consistent with this interpretation, alternative explanations exist. One alternative explanation for lower return synchronicity (at the firm level) could be an increase in noise trading activities, leading to uninformative price movements. Our data also support this interpretation. First, the presence of analysts may simply reduce noise and inefficiency in the price formation process, thus leading to less firm-specific volatility. Second, insider trading may limit the information gathering and processing activities of other parties (e.g., Fishman and Hagerty, 1992), resulting in firm-specific returns that are driven less by new information and more by noise trading.

To corroborate our interpretations about the type of information these three parties contribute to the price formation process, we perform two additional sets of tests. The first test examines the incremental explanatory power of industry-level returns conditional on these three informed parties' activities. The second test examines whether the informed parties differentially influence the timing of the incorporation of the firm and industry-specific components of earnings news into prices.

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<sup>8</sup> Bushee [1998] uses actual institutional trading behavior to differentiate types of institutions. We leave to future research the investigation of associations between institutional trading types and the incorporation of firm-specific

Consistent results will help corroborate our interpretation of the primary results, and validate the use of synchronicity as a measure of relative information type influencing prices.

#### ***4.1 Relation between informed trading activities and the incremental explanatory power of industry-level returns to explain firm returns***

To the extent analysts possess industry expertise and contribute industry-level information into the price formation process, the incremental explanatory power of industry-level returns (relative to market-level returns alone) should be positively related to the number of analyst revisions, *ceteris paribus*. Similarly, analyst coverage could facilitate intra-industry information transfers, leading to greater co-movement between firm-level and industry-level returns. In contrast, insider and institutional trading should contribute relatively less to the explanatory power of industry-level news.

To measure the incremental explanatory power of industry returns (over market returns), we create the variable R2DIFF, which is defined as the difference between the r-squared of equation [1] and the r-squared from the following regression:

$$RET_{i,t} = \alpha + \beta_1 MARET_{i,t} + \beta_2 MARET_{i,t-1} + \varepsilon_{i,t} \quad [7]$$

This model is similar to equation [1], except the only independent variables are the current and lagged value-weighted market returns. In other words, R2DIFF equals the incremental explanatory power of industry-level returns over market returns to explain variation in firm-level returns.

To shed light on the extent to which these informed traders influence the relative importance of industry-level returns to explain firm-level returns, we annually estimate the following model:

$$R2DIFF_{i,t} = \alpha_1 + \alpha_2 I + \alpha_3 REG + \beta_1 \log(TRADE_{i,t}) + \beta_2 \log(\Delta INST_{i,t}) + \beta_3 \log(NREV_{i,t}) + \beta_4 STDROA_{i,t} + \beta_5 DIVERS_{i,t} + \beta_6 FUNDCORR_{i,t} + \beta_7 \log(HERF_{i,t}) + \beta_8 \log(NIND_{i,t}) + \beta_9 \log(MVE_{i,t}) + \varepsilon_{i,t} \quad [8]$$

Table 6 presents average coefficients from seventeen annual estimations. T-statistics are based on the empirically derived distribution of observed coefficients.

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versus industry-level information into stock prices.

After controlling for firm-specific factors, we find that the incremental ability of industry-level returns to explain firm-specific return variation is an increasing function of analyst revisions and a decreasing function of changes in institutional holdings and insider transactions. Intuitively, the results suggest that analysts improve the firm's information environment by using their industry-level expertise to interpret and predict firm-level performance in the context of industry-level information. Conversely, greater institutional activity and more insider trades imply that a (relatively) smaller portion of a firm's stock return can be explained by industry-level information. The direction of these relations is consistent with each party's relative access to firm-level and industry-level information.

However, these results can also be an artifact of self-selection. Industry-groupings, as defined by analysts, tend to be highly synchronized. Specifically, recent work by Bhojraj, Lee and Oler [2002] show that analyst-based industry classifications are associated with greater return co-movement than firm groupings based on SIC or NAICS codes. To the extent that analysts are attracted to follow firms with strong ties to industry fundamentals (where industry data is inherently more value relevant), analyst coverage improves intra-industry information transfers. Moreover, despite common fundamentals, analyst coverage itself may induce heightened return co-movement if analysts treat covered firms as a bundled portfolio (i.e., overstate fundamental correlation and treat the firms as a portfolio of similar securities). Recent work by Barberis and Shleifer [2003] and Barberis, Shleifer and Wurgler [2001], for example, discuss how investors classify firms together, and that this classification increases return co-movement. Together, our evidence clearly shows that the presence of analyst coverage increases return synchronicity. Moreover, we show that analysts are attracted to firms with common return co-movement. The extent to which the increase in co-movement given analyst coverage reflects the more efficient transfer of intra-industry information or naïve bundling of less than perfectly correlated firms is an interesting topic for future research.

#### ***4.2 Impact of informed parties on the timing of industry vs. firm-specific earnings information incorporation into prices***

The results in Ball and Brown [1967] suggest that a firm's annual earnings innovation can be decomposed into a market component, an industry component and a firm-specific component. Using that conclusion, Ayers and Freeman [1997] decompose annual earnings innovations into these three components and document that the industry component of earnings is incorporated into a firm's stock price earlier than the firm-specific component. Ayers and Freeman argue that this differential timing is due to the market having more opportunities to learn of, and incorporate into prices, the component of a firm's earnings that is common across firms in its industry.

Specifically, Ayers and Freeman annually estimate the following cross-sectional model:

$$CAR_{i,t} = \alpha + \sum_{\tau=-1}^1 \delta_{\tau} I_{i,t+\tau} + \sum_{\tau=-1}^1 \gamma_{\tau} F_{i,t+\tau} + \varepsilon_{i,t} \quad [9]$$

where  $CAR_{i,t}$  is the value-weighted market-adjusted return for firm  $i$  for fiscal year  $t$ . Firm and market index returns are measured from the start of the fourth month of year  $t$  to the end of the third month of year  $t+1$ . Industry and firm-specific components of each year's earnings innovation are as defined in Ayers and Freeman. Specifically,  $I_{i,t}$  is measured as  $\Delta IE_{j,t} - \Delta ME_t$ , where  $\Delta IE_{j,t}$  is the median annual change in firm earnings for all firms sharing firm  $i$ 's two digit SIC code  $j$  in year  $t$  and  $\Delta ME_t$  is the median  $\Delta IE_{j,t}$  for all industries in year  $t$ .  $\Delta FE_{i,t}$  is the first difference in firm  $i$ 's earnings divided by its beginning of the year market value.  $F_{i,t}$ , which represents the firm-specific component of firm  $i$ 's change in earnings, is measured as  $\Delta FE_{i,t} - \Delta IE_{j,t}$ .

Ayers and Freeman find that the coefficients on contemporaneous and one-year ahead industry earnings innovations ( $\delta_0$  and  $\delta_1$ ) are significantly greater than corresponding coefficients on the contemporaneous and one-year ahead firm-specific components of earnings changes ( $\gamma_0$  and  $\gamma_1$ ) after controlling for lagged earnings innovations. Moreover, the coefficient on the lagged firm-

specific earnings component ( $\gamma_1$ ) is significantly positive, while the coefficient on the lagged industry-level earnings innovation is negative and insignificantly different than zero.

We extend Ayers and Freeman's methodology to examine whether analyst forecasting activity, changes in institutional ownership and insider trading activity differentially influence these timing relations in a manner consistent with each party's relative information acquisition and dissemination advantage. We modify their methodology to control for a potential misspecification arising from an errors-in-variables problem and for known cross-sectional determinants of annual returns.<sup>9</sup> Specifically, we annually estimate the following three cross-sectional models:

$$CAR_{i,t} = \alpha + \lambda_1 I_{i,t} + \lambda_2 I_{i,t+1} + \gamma_1 F_{i,t} + \gamma_2 F_{i,t+1} + \lambda_3 I_{i,t+1} * \log(NREV_{i,t}) + \gamma_3 F_{i,t+1} * \log(NREV_{i,t}) + \beta_1 CAR_{i,t+1} + \beta_2 \log(NREV_{i,t}) + \beta_3 \log(MVE_{i,t-1}) + \beta_4 \log(MB_{i,t-1}) + \varepsilon_{i,t} \quad [10]$$

$$CAR_{i,t} = \alpha + \lambda_1 I_{i,t} + \lambda_2 I_{i,t+1} + \gamma_1 F_{i,t} + \gamma_2 F_{i,t+1} + \lambda_3 I_{i,t+1} * \log(\Delta INST_{i,t}) + \gamma_3 F_{i,t+1} * \log(\Delta INST_{i,t}) + \beta_1 CAR_{i,t+1} + \beta_2 \log(\Delta INST_{i,t}) + \beta_3 \log(MVE_{i,t-1}) + \beta_4 \log(MB_{i,t-1}) + \varepsilon_{i,t} \quad [11]$$

$$CAR_{i,t} = \alpha + \lambda_1 I_{i,t} + \lambda_2 I_{i,t+1} + \gamma_1 F_{i,t} + \gamma_2 F_{i,t+1} + \lambda_3 I_{i,t+1} * \log(TRADE_{i,t}) + \gamma_3 F_{i,t+1} * \log(TRADE_{i,t}) + \beta_1 CAR_{i,t+1} + \beta_2 \log(TRADE_{i,t}) + \beta_3 \log(MVE_{i,t-1}) + \beta_4 \log(MB_{i,t-1}) + \varepsilon_{i,t} \quad [12]$$

These models are estimated annually between 1984 and 2000. The average coefficients from these 17 estimations are tested against a null of zero using the distribution of the generated coefficients. Consistent with the methodology employed in Ayers and Freeman, only December 31<sup>st</sup> year-end firms are included in the return-earnings sample. The sample is also restricted to 2-digit SIC industries with at least 10 firm-year observations. Firm-year observations containing an absolute earnings realization greater than 1.5 are excluded from the sample. All earnings (price) data is gathered through Compustat (CRSP). This methodology yields a final sample of 22,535 firm-year observations.

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<sup>9</sup> Following the discussion in Collins, Kothari, Shanken and Sloan [1994], we include next period returns ( $CAR_{i,t+1}$ ) to control for the unexpected components of future earnings news. This approach has been applied in recent long-window ERC studies examining the timeliness of earnings (e.g., Lundholm and Myers, 2002; Gelb and Zarowin, 2002). We also include the log of firm size and market-to-book ratios to control for differences in returns arising from these factors.

Table 7, panel A, presents descriptive statistics for this sub-sample of firms. In general, these firms are larger and more profitable than the set of firms included in our synchronicity tests. In terms of annual earnings innovations, the mean  $\Delta ROE$  is 0.010, with 39.4% of the firms reporting a decline in annual earnings. In terms of industry and firm-specific earnings components, the average change in industry-specific earnings before and after adjusting for market-wide earnings innovations is 0.007 and 0.000, respectively. The mean firm-specific earnings innovation, after controlling for the median change in industry earnings, is 0.007.

Table 7, panels B and C present average coefficients from annual estimations of equation [9] through [12]. Equation [9] (panel B) replicates the model in Ayers and Freeman [1997] with the addition of controls for future return, firm size and market-to-book ratio and with the omission of a lagged earnings term. Consistent with AF's results, the coefficients on  $I_{j,t}$  and  $I_{j,t+1}$  are positive and significantly greater than coefficients on  $F_{i,t}$  and  $F_{i,t+1}$ , respectively.<sup>10</sup>

Panel C presents additional evidence on these return-earnings relations, conditional on the level of analyst forecasting activity (eq. [10]), changes in institutional ownership (eq. [11]) and insider transactions (eq. [12]). Consistent with the argument that analysts increase the firm's overall information environment, our estimation reveals that *both* the industry and firm-specific component of next period's earnings are more strongly associated with current period returns in the presence of analyst forecasting activities ( $\lambda_3 > 0$  and  $\gamma_3 > 0$ ). Thus, analyst revisions accelerate the incorporation of both components of future earnings news, consistent with their activities both communicating firm-specific information and improving intra-industry information transfers.<sup>11</sup>

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<sup>10</sup> Ayers and Freeman [1997] included lagged, concurrent and leading earnings components in their model. Our focus is on the incorporation of future information; however, similar to other FERC studies, we control for concurrent earnings in our models. Results are similar if the lagged earnings terms are included. The lagged terms are omitted for parsimony.

<sup>11</sup> Prior research shows that firms with analyst coverage (Ayers and Freeman, 2001) and institutional ownership (Jiambalvo, Rajgopal and Venkatachalam, 2002) have more timely prices with respect to future earnings news. However, existing research does not identify the type of earnings information (i.e., firm-specific or industry component of earnings) their activities contribute to the price formation process.

In contrast, the second estimation in panel C documents the association between current returns and future earnings conditional on institutional trading. While industry earnings news continues to have a larger unconditional coefficient than firm-specific earnings news, changes in institutional holdings significantly increases the weight on future firm-specific earnings ( $\gamma_3 > 0$ ) in current returns. In contrast, the presence of institutional trading has no effect on the incorporation of future industry news into current price. Thus, institutional trading activity appears to be associated with an acceleration of firm-specific earnings information into prices alone.<sup>12</sup>

Finally, our estimation of equation [12] presents the return-earnings evidence conditional on insider trading activity. Consistent with our conjecture that insider trades are based on future firm-specific earnings news, we find that the relation between current returns and the firm-specific components of next year's earnings innovations strengthens as insider-trading activity increases ( $\gamma_3 > 0$ ). Moreover, the presence of insider transactions has a significant negative effect on the incorporation of industry-level information ( $\lambda_3 < 0$ ), consistent with insider trading potentially crowding out the information activities of financial analysts (thereby impeding intra-industry information transfers). Together, this evidence suggests that both insider and institutional trades accelerate firm-specific earnings information into prices, while analysts accelerate the incorporation of both industry-level and firm-specific earnings components into current prices. These timeliness relations are consistent with each party's relative informational advantage and corroborate our interpretation that cross-sectional variation in stock return synchronicity reflects differences in the type of information flowing into prices as opposed to noise trading activity.

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<sup>12</sup> As noted earlier, Jiambalvo, Rajgopal and Venkatachalam [2002] document that higher levels of institutional *holdings* contribute to more timely prices. In untabulated regressions, we find a similar effect with institutional holdings increasing the association between current returns and future earnings news. Furthermore, the effect of institutional holdings is stronger for industry-level earnings news than for firm-level earnings news.

## 5. Conclusion

This paper examines the extent to which three classes of informed market participants – financial analysts, institutional investors and insiders – influence stock return synchronicity. Stock return synchronicity represents the extent to which firm-level returns are explained by industry and market returns. To the extent that these parties facilitate the incorporation of industry and market level information into prices, returns will display greater synchronicity; conversely, firm prices will have less synchronous movements if these parties primarily impound firm-specific information and do not aid in the intra-industry transfer of information. Consistent with each party's relative information advantage, we find evidence that insider and institutional transactions improve the flow of firm-specific information into individual stock prices, while analyst activities lead to greater price synchronization. The positive association between stock return synchronicity and analyst activities is posited to be an artifact of improved intra-industry information transfers – analysts gather information at both the firm and industry level, and their industry affiliation and expertise allows them to improve the efficiency of all prices in that industry. Additional tests show that insider and institutional trading accelerates the incorporation of firm-specific earnings news into stock prices, while analyst activity accelerates the incorporation of *both* firm-specific and industry-level earnings news into prices. By directly measuring the extent to which prices differentially incorporate specific components of one type of information, we are able to reinforce our information interpretation of stock return synchronicity.

The primary contribution of this paper is to document that cross-sectional variation in stock return synchronicity is associated with the presence of these informed parties' activities. Our results have several implications for future research. First, analyst following appears to increase stock return co-movement. An interesting question is whether the amount of observed co-movement, given analyst coverage, is optimal. Specifically, analyst coverage improves intra-industry information transfers; however, do industry affiliations increase co-movement beyond that supported

by the underlying fundamentals of the industry (e.g., Barberis, Shleifer and Wurgler [2001])?

Second, recent cross-country studies suggest that less synchronicity at the country level is equivalent to more informed prices. Such an interpretation about “informed” prices may be naïve if analysts are actually making prices more efficient via intra-industry information transfers. Finally, our results are also consistent with one type of informed trade crowding out other types of informed trade. For example, Bushman, Piotroski and Smith [2003] document an increase in the depth and breadth of analyst coverage in a country following the initial enforcement of laws regulating insider trading. Combined with the current paper’s results, it appears that insider-trading restrictions lead to a substitution of the firm-specific information provided by insider trades with the industry-level information provided by analysts. Whether such a tradeoff is optimal for purposes of capital allocation decisions is an important question for future research.

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## Appendix 1 Variable Definitions

Variable:	Definition
<b>Information flow variables:</b>	
$R^2$	= The coefficient of determination from the firm-year estimation of the model: $RET_{i,t} = \alpha + \beta_1 MARET_{i,t} + \beta_2 MARET_{i,t-1} + \beta_3 INDRET_{i,t} + \beta_4 INDRET_{i,t-1} + \varepsilon_{i,t}$ where MARET is the value-weighted market return and INDRET is the 2-digit SIC industry value weighted return for week t (not including the return of firm i).
SYNCH	= logarithmic transformation of $R^2$ , defined as $\log(R^2 / (1-R^2))$ .
R2DIFF	= The difference between $R^2$ (as defined) and the r-squared from the following regression: $RET_{i,t} = \alpha + \beta_1 MARET_{i,t} + \beta_2 MARET_{i,t-1} + \varepsilon_{i,t}$ R2DIFF equals the incremental explanatory power of industry-level returns over market returns to explain variation in firm-level returns.
CAR	= Summation of market-adjusted monthly returns for year t. Firm and value-weighted market returns are measured from the fourth month of year t to the third month of year t+1.
<b>Informed trading proxies:</b>	
NREV	= The number of forecast revisions of one-year ahead forecasts of annual earnings during the calendar year.
$\Delta INST$	= The absolute change in the number of shares held by institutions, as a fraction of annual trading volume.
INST	= The aggregate number of shares held by institutions, scaled by shares outstanding, at the beginning of the fiscal year.
TRADE	= The absolute value of total shares purchased by insiders less total shares sold by insiders, as a fraction of annual trading volume.
$\log(\cdot)$	= The log of each informed trading proxy is calculated as the log of one plus the respective raw realization of that proxy.
<b>Independent variables:</b>	
$I_{i,t}$	= Industry-component of firm i's change in earnings. Measured as $\Delta IE_{j,t} - \Delta ME_t$ , where $\Delta IE_{j,t}$ is the median annual change in firm earnings for all firms sharing firm i's two digit SIC code j in year t and $\Delta ME_t$ is the median $\Delta IE_{j,t}$ for all industries in year t.
$F_{i,t}$	= $\Delta FE_{i,t}$ is the first difference in firm i's earnings divided by its beginning of the year market value. $F_{i,t}$ , which represents the firm-specific component of firm i's change in earnings, is measured as $\Delta FE_{i,t} - \Delta IE_{j,t}$ .
MVE	= The market value of equity at the beginning of the calendar year.
STDROA	= The standard deviation of return on assets (ROA) measured over the years 1984 through 2000.
DIVERS	= A revenue-based Herfindahl index of firm diversification using reported business segments.
FUNDCORR	= The logarithmic transformation of the r-squared from a regression of the firm's quarterly return on assets on a value-weighted industry index of ROA. FUNDCORR is estimated every three years using twelve quarterly observations in each firm-specific regression.
HERF	= A revenue-based Herfindahl index of industry-level concentration.
NIND	= The average number of firms used to calculate the weekly industry return index.
REG	= An indicator variable equal to one if the firm operated in a regulated industry (defined as the two-digit SIC codes industries 62 (financial institutions) and 49 (utilities)).
ROA	= Return on assets, measured as income before extraordinary items scaled by average total assets.
$abs(\Delta ROA)$	= Absolute change in the current year's return on assets
$abs(RET)$	= Absolute market-adjusted return for the firm for the preceding year (i.e., year t-1), where market returns are defined as the value-weighted market return (including dividends).
MB	= Market-to-book ratio, measured as MVE scaled by beginning of the year book value of equity.
SHRTURN	= Share turnover, defined as total annual volume scaled by total shares outstanding.

**Table 1**  
**Descriptive Statistics**

This table presents descriptive statistics for the sample of firm-year observations available between fiscal years 1984 and 2000. All variables are as defined in Appendix 1. n=74,571

	Mean	Std. Dev.	5 <sup>th</sup> Pctl.	25 <sup>th</sup> Pctl.	Median	75 <sup>th</sup> Pctl.	95 <sup>th</sup> Pctl.
<i>Stock return synchronicity:</i>							
R-SQUARED	0.193	0.153	0.029	0.080	0.148	0.261	0.524
SYNCH	-1.742	1.088	-3.519	-2.443	-1.754	-1.040	0.096
<i>Measures of informed trade</i>							
NREV	8.100	17.106	0.000	0.000	0.000	8.000	47.000
log(NREV)	0.985	1.428	0.000	0.000	0.000	2.197	3.871
$\Delta$ INST (%)	9.510	14.738	0.000	0.000	3.810	12.367	39.815
log( $\Delta$ INST)	0.083	0.117	0.000	0.000	0.037	0.116	0.335
INST (%)	23.491	25.640	0.000	0.000	14.981	40.230	75.459
TRADE (%)	0.723	3.289	0.000	0.000	0.026	0.370	2.991
log(TRADE)	0.007	0.027	0.000	0.000	0.0003	0.004	0.029
<i>Firm and industry characteristics</i>							
MVE	1,430.4	8,712.7	5.320	28.075	108.418	525.415	5,035.1
log(MVE)	4.836	2.092	1.667	3.321	4.660	6.233	8.521
STDROA	0.030	0.134	0.0008	0.005	0.012	0.031	0.112
DIVERS	0.874	0.221	0.373	0.794	1.000	1.000	1.000
FUNDCORR	-2.499	2.350	-6.873	-3.682	-2.130	-0.948	0.581
HERF	0.086	0.088	0.018	0.039	0.061	0.094	0.254
NIND	258.25	226.12	22.460	73.400	195.160	399.780	759.100
ROA	-0.019	0.291	-0.425	-0.014	0.029	0.072	0.162
$\Delta$ ROA	-0.009	0.224	-0.224	-0.033	-0.0008	0.002	0.018
MB	4.260	75.703	0.055	1.109	1.736	3.022	9.062
SHRTURN	0.962	1.268	0.117	0.325	0.609	1.126	2.991
log(SHRTURN)	-0.514	0.988	-2.147	-1.124	-0.497	0.119	1.095

**Table 2**  
**Correlation Matrix**

This table presents correlation matrices for the full (synchronicity) sample of firm-year observations. Spearman (Pearson) correlations presented below (above) the diagonal. See Appendix 1 for variable definitions. n=74,571.

	SYNCH	NREV	$\Delta$ INST	TRADE	MVE	ROE	$\Delta$ ROE	STDROA	DIVERS	FUNDCORR	HERF
SYNCH	1.000 -	0.335 (0.000)	0.094 (0.000)	-0.050 (0.000)	0.188 (0.000)	0.018 (0.000)	0.001 (0.719)	-0.041 (0.000)	-0.151 (0.000)	0.056 (0.000)	-0.012 (0.001)
NREV	0.249 (0.000)	1.000 -	0.040 (0.010)	-0.025 (0.000)	0.306 (0.000)	0.012 (0.001)	-0.001 (0.711)	-0.041 (0.000)	-0.179 (0.000)	0.078 (0.000)	0.044 (0.000)
$\Delta$ INST	0.134 (0.000)	0.447 (0.000)	1.000 -	0.050 (0.000)	0.003 (0.390)	0.016 (0.000)	-0.001 (0.266)	-0.004 (0.33)	-0.014 (0.000)	0.003 (0.42)	0.005 (0.15)
TRADE	0.047 (0.000)	0.230 (0.000)	0.387 (0.000)	1.000 -	-0.014 (0.000)	0.002 (0.530)	0.002 (0.631)	-0.002 (0.602)	0.006 (0.103)	-0.003 (0.445)	0.008 (0.026)
MVE	0.505 (0.000)	0.319 (0.000)	0.278 (0.000)	0.098 (0.000)	1.000 -	0.006 (0.101)	-0.000 (0.929)	-0.022 (0.000)	-0.102 (0.000)	0.035 (0.000)	-0.007 (0.068)
ROE	0.176 (0.000)	0.021 (0.000)	0.160 (0.000)	0.117 (0.000)	0.284 (0.000)	1.000 -	0.741 (0.000)	-0.209 (0.000)	0.002 (0.514)	0.002 (0.581)	-0.002 (0.645)
$\Delta$ ROE	0.019 (0.000)	0.003 (0.426)	0.038 (0.000)	0.734 (0.000)	0.070 (0.000)	0.502 (0.000)	1.000 -	-0.171 (0.000)	0.006 (0.090)	-0.009 (0.019)	0.006 (0.130)
STDROA	-0.187 (0.000)	-0.019 (0.000)	-0.222 (0.000)	-0.129 (0.000)	-0.436 (0.000)	-0.498 (0.000)	-0.096 (0.000)	1.000 -	0.047 (0.000)	-0.001 (0.859)	-0.004 (0.217)
DIVERS	-0.150 (0.000)	-0.109 (0.000)	-0.096 (0.000)	-0.003 (0.385)	-0.230 (0.000)	-0.072 (0.000)	0.007 (0.045)	0.131 (0.000)	1.000 -	-0.034 (0.000)	-0.113 (0.000)
FUNDCORR	0.062 (0.000)	-0.001 (0.882)	-0.015 (0.000)	-0.014 (0.000)	0.007 (0.059)	0.010 (0.005)	-0.042 (0.000)	0.015 (0.000)	0.038 (0.000)	1.000 -	0.049 (0.000)
HERF	-0.032 (0.000)	0.077 (0.000)	-0.113 (0.000)	-0.058 (0.001)	-0.175 (0.000)	-0.050 (0.000)	-0.013 (0.000)	0.247 (0.000)	-0.031 (0.000)	-0.007 (0.041)	1.000 -

**Table 3**  
**Relations between Stock Return Synchronicity and Analyst Forecasting Activity, Changes in Institutional Ownership and Insider Trading Activity**

This table presents average coefficients from 17 annual estimations of the following model:

$$\text{SYNCH}_{i,t} = \alpha_1 + \alpha_2 I + \alpha_3 \text{REG} + \beta_1 \log(\text{NREV}_{i,t}) + \beta_2 \log(\Delta \text{INST}_{i,t}) + \beta_3 \log(\text{TRADE}_{i,t}) + \beta_4 \text{STDROA}_{i,t} + \beta_5 \text{DIVERS}_{i,t} + \beta_6 \text{FUNDCORR}_{i,t} + \beta_7 \log(\text{HERF}_{i,t}) + \beta_8 \log(\text{NIND}_{i,t}) + \beta_9 \log(\text{MVE}_{i,t}) + \varepsilon_{i,t}$$

		Average coefficients from annual estimations				
	Predict	Est. [1]	Est. [2]	Est. [3]	Est. [4]	Est. [5]
Intercept		-3.256 (-25.68)	-3.229 (-25.58)	-3.234 (-26.20)	-3.247 (-25.77)	-3.197 (-26.17)
REG	+	0.178 (2.95)	0.176 (2.92)	0.178 (2.94)	0.179 (2.97)	0.177 (2.93)
log(NREV)	+	- -	0.039 (11.94)	- -	- -	0.040 (11.59)
log( $\Delta$ INST)	?	- -	- -	-0.265 (-3.96)	- -	-0.274 (-4.32)
log(TRADE)	-	- -	- -	- -	-0.813 (-4.72)	-0.756 (-4.49)
STDROA	-	-0.421 (-2.76)	-0.395 (-2.61)	-0.455 (-3.03)	-0.431 (-2.80)	-0.443 (-2.92)
DIVERS	+	0.070 (2.53)	0.074 (2.69)	0.069 (2.55)	0.070 (2.55)	0.074 (2.73)
FUNDCORR	+	0.007 (3.96)	0.006 (3.83)	0.007 (4.03)	0.007 (3.95)	0.006 (3.87)
log(HERF)	+	0.265 (2.52)	0.269 (2.57)	0.251 (2.43)	0.262 (2.53)	0.253 (2.49)
log(NIND)	?	0.009 (1.35)	0.008 (1.25)	0.006 (1.06)	0.008 (1.24)	0.005 (0.84)
log(MVE)	?	0.290 (27.09)	0.277 (27.95)	0.292 (28.03)	0.289 (26.99)	0.278 (29.04)
Ave. Adj. R <sup>2</sup>		35.2%	35.4%	35.3%	35.2%	35.6%

See Appendix 1 for variable definitions. Average coefficients from 17 annual estimations of the preceding model for each informed trader proxy and 17 annual estimations including all three informed trading proxies (“joint estimation”) are presented. T-statistics (in parenthesis) are based on standard errors derived from the empirical distribution of these annual coefficient estimates.

**Table 4**  
**Simultaneous Estimations of the Relations between Stock Return Synchronicity and Analyst Forecasting Activity, Changes in Institutional Ownership and Insider Trading**

This table presents average coefficients from 17 annual estimations of the following set of models:

$$\begin{aligned} \text{SYNCH}_{i,t} &= \alpha_1 + \alpha_2 I + \alpha_4 \text{REG} + \beta_1 \log(\text{NREV}_{i,t}) + \beta_2 \text{STDROA}_{i,t} + \beta_3 \text{DIVERS}_{i,t} + \beta_4 \text{FUNDCORR}_{i,t} + \beta_5 \log(\text{HERF}_{i,t}) + \beta_6 \log(\text{NIND}_{i,t}) + \beta_7 \log(\text{MVE}_{i,t}) + \varepsilon_{i,t} \\ \log(\text{NREV}_{i,t}) &= \alpha_1 + \alpha_2 \text{REG}_{i,t} + \beta_1 \log(\text{MVE}_{i,t}) + \beta_2 \text{ROA}_{i,t} + \beta_3 \log(\text{SHRTURN}_{i,t}) + \beta_4 \text{STDROA}_{i,t} + \beta_5 \text{SYNCH}_{i,t} + \varepsilon_{i,t} \\ \text{SYNCH}_{i,t} &= \alpha_1 + \alpha_2 I + \alpha_4 \text{REG} + \beta_1 \log(\Delta \text{INST}_{i,t}) + \beta_2 \text{STDROA}_{i,t} + \beta_3 \text{DIVERS}_{i,t} + \beta_4 \text{FUNDCORR}_{i,t} + \beta_5 \log(\text{HERF}_{i,t}) + \beta_6 \log(\text{NIND}_{i,t}) + \beta_7 \log(\text{MVE}_{i,t}) + \varepsilon_{i,t} \\ \log(\Delta \text{INST}_{i,t}) &= \alpha_1 + \alpha_2 \text{REG}_{i,t} + \beta_1 \log(\text{MVE}_{i,t}) + \beta_2 \log(\text{MB}_{i,t}) + \beta_3 \log(\text{SHRTURN}_{i,t}) + \beta_4 \text{abs}(\text{RET}_{i,t-1}) + \beta_5 \text{abs}(\Delta \text{ROA}_{i,t}) + \beta_6 \text{SYNCH}_{i,t} + \varepsilon_{i,t} \\ \text{SYNCH}_{i,t} &= \alpha_1 + \alpha_2 I + \alpha_4 \text{REG} + \beta_1 \log(\text{TRADE}_{i,t}) + \beta_2 \text{STDROA}_{i,t} + \beta_3 \text{DIVERS}_{i,t} + \beta_4 \text{FUNDCORR}_{i,t} + \beta_5 \log(\text{HERF}_{i,t}) + \beta_6 \log(\text{NIND}_{i,t}) + \beta_7 \log(\text{MVE}_{i,t}) + \varepsilon_{i,t} \\ \log(\text{TRADE}_{i,t}) &= \alpha_1 + \alpha_2 \text{REG}_{i,t} + \beta_1 \log(\text{MVE}_{i,t}) + \beta_2 \log(\text{MB}_{i,t}) + \beta_3 \log(\text{SHRTURN}_{i,t}) + \beta_4 \text{abs}(\text{RET}_{i,t-1}) + \beta_5 \text{abs}(\Delta \text{ROA}_{i,t}) + \beta_6 \text{SYNCH}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Dependent Variable:	Analyst Revisions		Institutional Trading		Insider Trading	
	SYNCH	log(NREV)	SYNCH	log(ΔINST)	SYNCH	log(TRADE)
Intercept	-2.672 (-22.41)	0.470 (0.95)	-2.755 (-13.13)	0.108 (2.00)	-2.608 (-12.86)	-0.013 (-0.99)
REG	0.148 (4.02)	-0.061 (-1.46)	0.177 (4.12)	-0.003 (-0.46)	0.286 (3.96)	0.003 (1.93)
log(NREV)	0.784 (15.93)	-	-	-	-	-
log(ΔINST)	-	-	-4.474 (-9.18)	-	-	-
log(TRADE)	-	-	-	-	-46.343 (-9.77)	-
SYNCH	-	0.341 (2.11)	-	0.037 (2.00)	-	-0.005 (-1.16)
abs(ΔROA)	-	-	-	-0.039 (-4.78)	-	-0.004 (-3.28)
log(MVE)	0.035 (1.73)	0.229 (4.84)	0.313 (14.64)	-0.000 (-0.04)	0.234 (12.76)	0.0004 (0.31)
ROA	-	0.177 (7.87)	-	-	-	-
log(MB)	-	-	-	0.004 (2.02)	-	0.001 (2.69)
abs(RET)	-	-	-	-0.003 (-1.30)	-	0.001 (1.93)
log(SHRTURN)	-	0.120 (4.50)	-	-0.032 (-9.09)	-	-0.002 (-3.34)
STDROA	-0.039 (-0.19)	-0.665 (-4.79)	-1.399 (-4.06)	-	-0.969 (-3.46)	-
DIVERS	0.147 (3.26)	-	0.078 (2.88)	-	0.100 (13.62)	-
FUNDCORR	0.000 (0.02)	-	0.005 (2.71)	-	0.004 (1.77)	-
log(HERF)	0.325 (2.68)	-	0.075 (0.66)	-	0.244 (1.71)	-
log(NIND)	-0.006 (-0.73)	-	-0.030 (-2.51)	-	-0.028 (-3.36)	-

See Appendix 1 for variable definitions. T-statistics (in parentheses) are based on standard errors derived from the empirical distribution of these annual coefficient estimates.

**Table 5**  
**Relations between Stock Return Synchronicity and Institutional Ownership: Role of Institutional Holdings versus Change in Holdings**

This panel presents average coefficients from 17 annual estimations of the following model:

$$\text{SYNCH}_{i,t} = \alpha_1 + \alpha_2 I + \alpha_3 \text{REG} + \beta_1 \log(\Delta \text{INST}_{i,t}) + \beta_2 \log(\text{INST}_{i,t}) + \beta_3 \log(\Delta \text{INST}_{i,t}) * \log(\text{INST}_{i,t}) + \beta_4 \text{STDROA}_{i,t} + \beta_5 \text{DIVERS}_{i,t} + \beta_6 \text{FUNDCORR}_{i,t} + \beta_7 \log(\text{HERF}_{i,t}) + \beta_8 \log(\text{NIND}_{i,t}) + \beta_9 \log(\text{MVE})_{i,t} + \epsilon_{i,t}$$

Estimation:	Average coefficients from annual estimations			
	Est. [1]	Est. [2]	Est. [3]	Est. [4]
Intercept	-3.234 (-26.20)	-3.255 (-26.11)	-3.225 (-26.48)	-3.225 (-26.46)
REG	0.178 (2.94)	0.201 (3.51)	0.205 (3.56)	0.206 (3.61)
log( $\Delta$ INST)	-0.265 (-3.96)	-	-0.380 (-6.52)	-0.502 (-8.05)
log(INST)	-	0.303 (5.20)	0.356 (5.99)	0.313 (4.96)
log( $\Delta$ INST)*log(INST)	-	-	-	0.618 (2.89)
STDROA	-0.455 (-3.03)	-0.331 (-2.37)	-0.382 (-2.67)	-0.389 (-2.70)
DIVERS	0.069 (2.55)	0.073 (2.69)	0.073 (2.72)	0.075 (2.81)
FUNDCORR	0.007 (4.03)	0.007 (4.25)	0.007 (4.28)	0.007 (4.29)
log(HERF)	0.251 (2.43)	0.262 (2.48)	0.247 (2.36)	0.247 (2.36)
log(NIND)	0.006 (1.06)	0.010 (1.52)	0.007 (1.17)	0.007 (1.21)
log(MVE)	0.292 (28.03)	0.279 (29.36)	0.280 (30.56)	0.280 (30.79)
Average Adjusted R-Squared	35.3%	35.5%	35.7%	35.8%

See Appendix 1 for variable definitions. T-statistics (in parenthesis) are based on the standard errors derived from the empirical distribution of the annual coefficient estimates.

**Table 6**  
**Relation between the Incremental Explanatory Power of Industry-level Returns and the Activities of Analysts, Institutions and Insiders**

This table presents average coefficients from 17 annual estimations of the following model:

$$R2DIFF_{i,t} = \alpha_1 + \alpha_2 I + \alpha_3 REG + \beta_1 \log(NREV_{i,t}) + \beta_2 \log(\Delta INST_{i,t}) + \beta_3 \log(TRADE_{i,t}) + \beta_4 STDROA_{i,t} + \beta_5 DIVERS_{i,t} + \beta_6 FUNDCORR_{i,t} + \beta_7 \log(HERF_{i,t}) + \beta_8 \log(NIND_{i,t}) + \beta_9 \log(MVE)_{i,t} + \epsilon_{i,t}$$

where  $R2DIFF_{i,t} = R^2_{MI} - R^2_M$ .  $R^2_{MI}$  and  $R^2_M$  are the coefficients of determination from the regression of firm  $i$ 's return on market and industry returns, and market returns, respectively, during calendar year  $t$ .

Estimation:	Average coefficients from annual estimations				
	[1]	[2]	[3]	[4]	[5]
Intercept	-0.022 (-3.42)	-0.020 (-3.26)	-0.020 (-3.21)	-0.021 (-3.26)	-0.015 (-2.50)
REG	0.093 (12.13)	0.093 (12.14)	0.093 (11.90)	0.093 (12.17)	0.094 (12.19)
log(NREV)	- -	0.002 (6.12)	- -	- -	0.002 (6.56)
log( $\Delta$ INST)	- -	- -	-0.042 (-7.27)	- -	-0.042 (-7.49)
log(TRADE)	- -	- -	- -	-0.061 (-4.50)	-0.050 (-3.89)
STDROA	0.005 (1.07)	0.006 (1.36)	-0.002 (-0.47)	0.004 (0.89)	0.001 (0.17)
DIVERS	0.017 (8.41)	0.017 (8.40)	0.016 (8.20)	0.017 (8.37)	0.016 (8.28)
FUNDCORR	0.001 (8.95)	0.001 (8.83)	0.001 (8.49)	0.001 (9.04)	0.001 (8.58)
log(HERF)	-0.001 (-0.07)	-0.0001 (-0.01)	-0.005 (-0.39)	-0.001 (-0.08)	-0.001 (-0.10)
log(NIND)	0.0001 (0.15)	0.0001 (0.12)	-0.0003 (-0.32)	0.0001 (0.08)	-0.0001 (-0.17)
log(MVE)	0.012 (10.75)	0.011 (10.61)	0.012 (10.56)	0.012 (10.74)	0.011 (10.38)
Average Adjusted R-Squared	20.9%	21.0%	21.3%	20.9%	21.3%

See Appendix 1 for variable definitions. T-statistics (in parenthesis) are based on the standard errors derived from the empirical distribution of the annual coefficient estimates.

**Table 7**  
**Impact of Informed Parties on the Timing of the Incorporation of Industry and Firm-Specific Earnings Components into Prices**

Panel A: Descriptive statistics

This panel presents descriptive statistics for a sub-sample of December 31<sup>st</sup> year-end firm-year observations with sufficient price, earnings and industry-level observations to estimate equations [10] through [12]. All variables are as defined in Appendix 1. n=22,535.

	Mean	Std	5%	Q1	Median	Q3	95%
<i>Components of annual earnings innovation</i>							
ROE	0.047	0.148	-0.165	0.027	0.066	0.099	0.181
ΔROE	0.010	0.132	-0.130	-0.014	0.007	0.027	0.157
ΔIE	0.006	0.016	-0.015	-0.0001	0.006	0.011	0.023
I	-0.00008	0.015	-0.018	-0.006	0.000	0.005	0.018
F	0.007	0.121	-0.115	-0.018	0.0006	0.021	0.141
<i>Measures of informed trading activity</i>							
NREV	20.247	38.106	0.000	0.000	2.000	23.000	99.000
log(1+NREV)	1.634	1.728	0.000	0.000	1.099	3.178	4.595
ΔINST (%)	16.674	56.413	0.000	1.561	6.584	16.791	60.898
log(1+ΔINST)	0.126	0.194	0.000	0.015	0.064	0.155	0.476
TRADE (%)	0.870	3.878	0.000	0.0006	0.081	0.478	3.412
log(1+TRADE)	0.008	0.032	0.000	0.00001	0.0008	0.0048	0.034
<i>Firm characteristics</i>							
MVE	2,934.1	12,903.3	9.983	62.210	278.030	1,363.5	11,658
log(MVE)	5.707	2.164	2.300	4.131	5.628	7.218	9.364
MB	2.866	10.497	0.580	1.142	1.699	2.774	7.494
log(MB)	0.608	0.794	-0.544	0.132	0.530	1.020	2.014
CAR	0.021	0.504	-0.670	-0.231	-0.008	0.210	0.802

**TABLE 7 (continued)**

**Impact of Informed Parties on the Timing of the Incorporation of Industry vs. Firm-Specific Earnings Components into Prices**

Panels B and C presents average coefficients from the annual estimation of the following models:

$$CAR_{i,t} = \alpha + \lambda_1 I_{i,t} + \lambda_2 I_{i,t+1} + \gamma_1 F_{i,t} + \gamma_2 F_{i,t} + \lambda_3 I_{i,t+1} * \log(NREV_{i,t}) + \gamma_3 F_{i,t+1} * \log(NREV_{i,t}) + \beta_1 CAR_{i,t+1} + \beta_2 \log(NREV_{i,t}) + \beta_3 \log(MVE_{i,t-1}) + \beta_4 \log(MB_{i,t-1}) + \varepsilon_{i,t}$$

$$CAR_{i,t} = \alpha + \lambda_1 I_{i,t} + \lambda_2 I_{i,t+1} + \gamma_1 F_{i,t} + \gamma_2 F_{i,t} + \lambda_3 I_{i,t+1} * \log(\Delta INST_{i,t}) + \gamma_3 F_{i,t+1} * \log(\Delta INST_{i,t}) + \beta_1 CAR_{i,t+1} + \beta_2 \log(\Delta INST_{i,t}) + \beta_3 \log(MVE_{i,t-1}) + \beta_4 \log(MB_{i,t-1}) + \varepsilon_{i,t}$$

$$CAR_{i,t} = \alpha + \lambda_1 I_{i,t} + \lambda_2 I_{i,t+1} + \gamma_1 F_{i,t} + \gamma_2 F_{i,t} + \lambda_3 I_{i,t+1} * \log(TRADE_{i,t}) + \gamma_3 F_{i,t+1} * \log(TRADE_{i,t}) + \beta_1 CAR_{i,t+1} + \beta_2 \log(TRADE_{i,t}) + \beta_3 \log(MVE_{i,t-1}) + \beta_4 \log(MB_{i,t-1}) + \varepsilon_{i,t}$$

17 cross-sectional annual estimations were performed. T-statistics based on the empirical distribution of annual coefficients are presented in parentheses. All variables are defined in Appendix 1. .

**Panel B: Confirmation of Ayers and Freeman [1997] result**

Intercept	I <sub>t</sub>	I <sub>t+1</sub>	F <sub>t</sub>	F <sub>t+1</sub>			CAR <sub>t+1</sub>		log(MVE)	log(MB)	Average Adjusted R <sup>2</sup>
0.064	2.511	1.184	0.545	0.189	-	-	-0.029	-	-0.010	-0.001	12.1%
(1.10)	(4.91)	(1.80)	(11.33)	(5.93)	-	-	(-0.91)	-	(-1.50)	(-0.42)	-

**Panel C: Relation between current returns and future earnings components conditional on the number of analyst forecast revisions, changes in institutional ownership and insider trading**

Intercept	I <sub>t</sub>	I <sub>t+1</sub>	F <sub>t</sub>	F <sub>t+1</sub>	I <sub>t+1</sub> * log(NREV)	F <sub>t+1</sub> * log(NREV)	CAR <sub>t+1</sub>	log(NREV)	log(MVE)	log(MB)	Average Adjusted R <sup>2</sup>
0.074	3.293	0.328	0.514	0.101	0.448	0.082	-0.028	0.011	-0.017	0.013	13.4%
(1.20)	(5.83)	(0.44)	(9.78)	(2.18)	(2.25)	(3.04)	(-0.97)	(2.48)	(-1.81)	(0.76)	-

Intercept	I <sub>t</sub>	I <sub>t+1</sub>	F <sub>t</sub>	F <sub>t+1</sub>	I <sub>t+1</sub> * log(ΔINST)	F <sub>t+1</sub> * log(ΔINST)	CAR <sub>t+1</sub>	log(ΔINST)	log(MVE)	log(MB)	Average Adjusted R <sup>2</sup>
0.106	2.186	1.062	0.481	0.153	0.116	0.373	-0.025	0.004	-0.012	0.010	12.8%
(1.50)	(4.57)	(1.78)	(7.52)	(3.80)	(0.09)	(1.96)	(-0.97)	(0.13)	(-1.49)	(0.60)	-

Intercept	I <sub>t</sub>	I <sub>t+1</sub>	F <sub>t</sub>	F <sub>t+1</sub>	I <sub>t+1</sub> * log(TRADE)	F <sub>t+1</sub> * log(TRADE)	CAR <sub>t+1</sub>	log(TRADE)	log(MVE)	log(MB)	Average Adjusted R <sup>2</sup>
0.069	2.277	1.377	0.532	0.167	-22.118	3.973	-0.027	-0.103	-0.013	0.013	13.0%
(1.11)	(4.82)	(2.25)	(10.30)	(4.83)	(-2.03)	(2.00)	(-0.92)	(-0.69)	(-1.48)	(0.75)	-