How Information Uncertainty is Priced Within the Earnings Announcement Windows

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Abstract

Earnings announcement (EA) presents a substantial risk to investors. This study examines whether the market prices such risk. We conjecture that as information propagates in a discrete process, the premium of EA risk is likely realized when there is intensified cash-flow news. As updated information helps resolve cash-flow uncertainty, expected stock returns are adjusted and the premium is realized. We construct an *ex ante* measure of expected information intensity (EII) and find that EA risk significantly predicts stock returns for firms with high EII. Controlling for known risk factors, stocks with high EA risk outperform those with low EA risk by 0.58% in monthly Fama-French five-factor alpha. We also show that EA risk premium is distinct from the well-documented announcement premium. To explore both premium, a feasible strategy of long stocks with both high-EII and high-EA risk and short stocks with low-EII yields a monthly 0.83% (annualized 9.96%) five-factor alpha.

Keywords**:** Earnings announcement risk; Risk premium; Information intensity; Cash-flow news; Announcement premium

JEL Classification**:** G12; G14

I. Introduction

Publicly traded firms in the US are required to report earnings on a quarterly basis. These announcements provide a venue for the management to update investors on firm performance. In the meantime, they also pose a substantial risk to investors as information disclosed by the management may contain unexpected shocks about firm fundamentals. On April 19, 2022, Netflix (NFLX) announced Q1 earnings and an unexpected decline in user subscription after market close. Its stock price dropped by 35.12% the following trading day. The literature also documents that earnings announcement risk may be non-diversifiable as individual firms' earnings surprises contain information on aggregate cash-flow shocks (Brown and Ball, 1967; Ball and Kothari, 1991; Barth and So, 2014; and Konchitchki and Patatoukas, 2014). The aforementioned Netflix announcement indeed spilled over to other firms including those in the online streaming industry.[1] Patton and Verardo (2012) estimate market beta for stocks in the S&P 500 index and find statistically and economically significant systematic risk on earnings announcement days.

Given the magnitude and importance of earnings announcement risk, surprisingly the literature has yet explored whether such risk is priced. The literature has documented an earnings announcement premium dating back to Beaver (1968), i.e., firms with earnings announcements in a given month on average earn significantly higher returns than those with no earnings announcements. However, at the individual firm level, do stocks with high earnings announcement risk earn significantly higher future returns than those with low earnings announcement risk? This question is important because the non-diversifiable component of a firm's cash-flow shocks is an important risk that directly links stock prices to firm fundamentals (Da and Warachka, 2009).

[1] The negative announcement of Netflix spilled over to other online streamers. The stock prices of Paramount Global (PARA), Roku (ROKU), Warner Bros. Discovery (WBD), and Disney (DIS) dropped by 8.60%, 6.17%, 6.04%, and 5.56%, respectively, on the same trading day.

Conventional asset pricing theory suggests that in a frictionless market, any systematic risk should be priced and consistently incorporated into stock prices. This study fills the gap in the literature and investigates whether the market prices earnings announcement risk.

In this study, we argue that as information propagates in a discrete process with time-varying intensity, risk premium may not be realized in a gradual and consistent manner. The literature documents that cash-flow news intensifies periodically concurring with important corporate events (Patell and Wolfson, 1981; Kalay and Lowenstein, 1985; and Dubinsky, Johannes, Kaeck and Seeger, 2019). We postulate that the premium of earnings announcement risk is thus likely concentrated on periods with high intensity of cash-flow news. We formally develop our hypothesis under the model of Vuolteenaho (2002) where realized stock returns can be decomposed into a cash-flow component and an expected-return component. On days with low information intensity, stock price changes are largely driven by noise or liquidity trading. Stock returns on these days offer little power for the inference of risk premium. However, when cash-flow news intensifies, e.g., on days with corporate announcements, the updated information affects not only a firm's expected cash-flows but also its cash-flow uncertainty (Ball and Brown, 1968; Kormendi and Lipe, 1987; Barth and So, 2014; and Dubinsky, Johannes, Kaeck and Seeger, 2019). As investors update their expectation of stock returns, both cash-flow news and risk premium are incorporated into stock prices. Thus, following corporate announcements, stock prices are more likely informative of risk premium.

Following the literature (Ball and Kothari, 1991; and Patton and Verardo, 2012), we estimate earnings announcement beta (hereafter EA beta) based on excess market beta over the earnings announcement window. Under the model of Patton and Verardo (2012), the magnitude of EA beta is jointly determined by a firm's unexpected cash-flow shock and its exposure to the aggregate systematic cash-flow shock. It is known that small firms tend to have high earnings surprises (Zhang, 2006) and cash flows of cyclical or growth firms are sensitive to aggregate shocks (Campbell, Polk, and Vuolteenaho, 2010). Over the period from 1982-2020, we show that consistent with Ball and Kothari (1991) and Patton and Verardo (2012), there is on average a positive excess market beta over the earnings announcement window. On average, small stocks, growth stocks, and past winners have relatively higher EA beta.

To investigate whether the pricing of earnings announcement risk is conditional on high information intensity, we construct an *ex ante* measure of expected information intensity (EII) based on recurrent corporate events, namely earnings and distribution announcements (So and Wang, 2014; and Bessembinder and Zhang, 2015). Firms with expected announcements are classified as having high EII and those without are classified as having low EII. The advantage of EII is that it measures expected information release by the management and focuses on the effect of anticipated events. The literature documents that information uncertainty intensifies prior to anticipated events (Patell and Wolfson, 1981; and Kalay and Lowenstein, 1985). The EII measure also complements the expected information consumption (EIC) of investors proposed by Ben-Rephael, Carlin, Da and Israelsen (2021). More importantly, EII allows us to construct feasible trading strategies exploring the relation between EA beta and future stock returns.

Each month, we first divide stocks into those with high EII and those with low EII. Within each subsample, we then sort stocks into quintiles based on past EA beta. Our results show that for stocks with low EII, there is no significant relation between EA beta and future stock returns. In sharp contrast, among stocks with high EII, EA beta has a significantly positive relation with future stock returns. We also confirm that the return spread between high- and low-EA beta stocks cannot be explained by known risk factors. A feasible trading strategy of long (short) stocks in the top (bottom) EA beta quintile yields a value-weighted monthly 0.58% (annualized 6.96%) Fama-French (2015) five-factor alpha. Moreover, we show that the relation between EA beta and future stock returns is persistent up to 12-month horizon. The findings support the conjecture that earnings announcement risk is priced when there is high intensity of cash-flow news.

As noted earlier, existing studies have documented a significant earnings announcement premium. That is, firms with earnings announcements in a given month have significantly higher returns than those with no earnings announcements. We show that earnings announcement risk premium is distinct from the announcement premium. We confirm that high-EII stocks on average significantly outperform low-EII stocks by a return spread of 0.43% in monthly Fama-French five-factor alpha. As reported earlier, within high-EII stocks, we further find that high-EA beta stocks significantly outperform low-EA beta stocks. To explore the earnings announcement risk premium together with the announcement premium, a feasible enhanced trading strategy of long stocks with both high EII and high EA beta and short stocks with low EII yields a value-weighted monthly 0.83% (annualized 9.96%) Fama-French five-factor alpha. The return of the enhanced strategy is almost double the announcement premium.

We perform additional analyses and show that our main findings are robust. First, we perform multivariate regressions and control for various firm characteristics. One potential concern is that since the risk premium is significant only for firms with expected corporate events, our results may be driven by market underreaction to past earnings surprises (Ball and Brown, 1968; and Bernard and Thomas, 1989). We include earnings surprises as a control variable and show that the results are robust. Second, to address the issue of nonsynchronous trading, we estimate EA beta following Dimson (1979) and show that the results are consistent. Third, we include the VAR cash-flow beta of Campbell and Vuolteenaho (2004) and Campbell, Giglio, Polk and Turley (2018) and quarterly earnings beta, estimated from quarterly earnings growth, as control variables. The relation between EA beta and future stock returns remains positive and significant for firms with high EII.

The underlying mechanism of our conjecture is that information production and consumption trigger the pricing of risk. To substantiate our argument, we perform further analyses to examine the effect of information production and investor information consumption. To sharpen our measure of information intensity, we zoom into days around corporate announcements and focus on stock returns over the announcement window. If risk premium is concentrated on days with intensified cash-flow news, higher returns for stocks with high EA beta should be realized mostly at the announcement window. For firms with earnings, distribution, or M&A announcements, we decompose monthly stock returns into announcement returns, i.e., cumulative returns over announcement window [-1, 4], and non-announcement returns. The extended event window allows the premium to be accumulated following the announcement. The results show that past EA beta has a significantly positive relation with announcement returns but has no significant relation with non-announcement returns. The coefficient of the cross-sectional regression implies a 9.1 bps premium over the six-day announcement window [-1, 4]. That is, the premium of EA beta is realized mostly at the arrival of information. We also find a significantly positive premium for VAR beta over the announcement window. Given that the VAR beta of Campbell, Giglio, Polk and Turley (2018) focuses on long-run cash-flow risk, the finding strengthens our argument that risk premium in general is likely realized following important corporate events. To further alleviate the concern that the significant relation between EA beta and announcement returns is driven by only earnings announcements, we also replicate our analysis by excluding earnings announcements and show that the results are consistent.

To examine the effect of investor information consumption, first, we examine the spillover effect to non-announcing firms. Ben-Rephael, Carlin, Da and Israelsen (2021) show evidence of spillover of investor information consumption to peer firms. For each announcing firm in our sample, we identify a non-announcing connected firm in the same industry with similar size. We find that for non-announcing connected firms, past EA beta also has a significantly positive relation with stock returns over the announcing firms' event window. The results suggest that due to investor consumption of news from announcing firms, the risk premium is realized for non-announcing connected firms as well. Second, we identify firms with high trading activity around announcements. Using excess turnover and excess trading volume as proxies for investor attention (Gervais, Kaniel and Mingelgrin, 2001; Barber and Odean, 2008; and Hou, Xiong, and Peng, 2009), we confirm that the premium is significant for firms with high investor trading activity.

Finally, we argue that for firms with high earnings uncertainty, information update and investor information consumption should have a stronger effect on the pricing of earnings announcement risk. This is because, for these firms, updated cash-flow news is more likely to resolve cash-flow uncertainty. We use standard deviation of past earnings surprises and analyst coverage as proxies for earnings uncertainty (Zhang, 2006) and confirm that the premium is significant for firms with high earnings uncertainty.

Our study contributes to several strands of literature. First, the literature documents that earnings announcements pose non-diversifiable risk to investors (Ball and Kothari, 1991; Barth and So, 2014; and Konchitchki and Patatoukas, 2014). Based on traded options, Barth and So (2014) finds evidence that investors command a premium for non-diversifiable volatility risk at earnings announcements. Dubinsky, Johannes, Kaeck and Seeger (2019) show that earnings announcement risk is priced in stock options. Our study is the first to examine whether earnings announcement risk is priced in stock returns. We show evidence that the risk is priced and the premium is realized conditional on high intensity of cash-flow news.

Second, the literature has proposed various cash-flow risk measures. For instance, Campbell and Vuolteenaho (2004) propose a measure of long-term cash-flow risk or "bad beta". Da and Warachka (2009) and Ellahie (2021) propose measures of earnings beta based on analyst revisions of earnings forecasts. Ball, Sadka, and Tseng (2021) propose an earnings beta based on individual firm's earnings and aggregate economic indicators. Savor and Wilson (2016) propose an announcement premium beta based on the loading of weekly stock returns on contemporaneous earnings announcement premium. The EA beta in our study focuses on the risk of corporate disclosure on earnings announcement days. The measure is based on stock returns around earnings announcements which reflect investor reaction to unexpected cash-flow shocks.

Third, Ben-Rephael, Carlin, Da and Israelsen (2021) propose a measure of expected information consumption (EIC) by investors and show that information consumption by investors has an important impact on asset prices. Based on recurrent corporate events (Kalay and Loewenstein, 1985; So and Wang, 2014; and Bessembinder and Zhang, 2015), we construct an expected information intensity (EII) measure. We show that both information production by firms and information consumption by investors are essential in attaining efficient asset pricing.

Fourth, existing studies have documented that expected returns and abnormal returns are often concentrated on days of important corporate events (Kalay and Lowenstein, 1985; Sloan, 1996; Jegadeesh and Titman, 1993; Titman, Wei and Xie, 2004; Jiang and Yao, 2013; and Engelberg, McLean and Pontiff, 2018). For instance, Jiang and Yao (2013) show that both size premium and value premium are realized on a few days with extreme price changes. Engelberg, McLean and Pontiff (2018) find that anomalous stock returns associated with various firm characteristics are 50% higher on corporate news days. The literature generally deems these findings as puzzling and hard to reconcile with existing asset pricing theories. In this study, we conjecture that as cash-flow news intensifies on corporate announcement days, both expected returns associated with cash-flow risk and abnormal returns driven by unexpected cash-flow news are concurrently incorporated into stock prices. Moreover, we argue that while our study focuses on the pricing of earnings announcement risk, the mechanism proposed in our study has general implications on the pricing of other risks. For instance, consistent with our conjecture, the premium of market beta is realized on macroeconomic announcement days when there is high intensity of market-wide information (Savor and Wilson, 2014).

The rest of the paper is structured as follows. Section II contains hypothesis development. Section III describes the data, the estimation of EA beta, and the estimation of expected information intensity (EII). Section IV presents the main results. Section V performs additional analyses. Section VI concludes.

II. Hypothesis Development

Our main conjecture is that the premium of earnings announcement risk is likely realized when there is high intensity of cash-flow news. This is because cash-flow news propagates in an uneven and discrete process with time-varying intensity. The key mechanism is that intensified cash-flow news not only directly affects a firm's expected cash flows but also its cash-flow uncertainty. As a result, investors update their expectation of stock returns. When they trade on cash-flow news, the premium associated with cash-flow risk is also incorporated into stock prices. We formally develop our hypothesis by resorting to the model of Vuolteenaho (2002).

Vuolteenaho (2002) derives a cash-flow-based model and decomposes the log book-to-market ratio (θ) as:

$$\theta_{t-1} = \kappa_{t-1} + \sum_{j=0}^{\infty} \rho^j r_{t+j} - \sum_{j=0}^{\infty} \rho^j (e_{t+j} - f_{t+j}) \quad (1)$$

where r_t denotes the excess log stock return; e_t denotes the return on equity, defined as the log of one plus cash-flow (CF_t) over the book equity ratio (B_{t-1}); f_t denotes the log of one plus the interest rate, ρ (<1) is the discount coefficient; and κ_t is a constant plus the approximation error. Applying changes in expectations from $t-1$ to t (ΔE_t), realized stock returns can be decomposed into a cash-flow component and a discount rate or expected return component:

$$r_t - E_{t-1}[r_t] = \Delta E_t\left[\sum_{j=0}^{\infty} \rho^j (e_{t+j} - f_{t+j})\right] + \kappa_t - \Delta E_t\left[\sum_{j=0}^{\infty} \rho^j r_{t+j}\right] \quad (2)$$

where $\kappa_t = \Delta E_t[\kappa_{t-1}]$. The first two terms capture the effect of cash-flow news and the last term captures the change in expected return.

As shown in the above model, stock price changes on a given day can be driven by cash-flow news or discount-rate news or both. On a normal trading day with low information intensity, stock price changes are largely driven by noise or liquidity trading. Stock returns on these days offer little power for the inference of expected stock returns or risk premium. However, on days with significant cash-flow news, e.g., via corporate announcements, stock price not only directly responds to cash-flow news but also to changes in expected returns. This is because updated cash-flow news also has a direct effect on a firm's cash-flow uncertainty. This in turn triggers investors to adjust their expectation of stock returns. The effect of cash-flow news intensity on cash-flow uncertainty and expected returns can be illustrated in the following relation:

$$\Delta E_t\left[\sum_{j=0}^{\infty} \rho^j r_{t+j}\right] = \lambda\left(E_t\left[V\left(\sum_{j=0}^{\infty} CF_{t+j+1} \,|I_t\right)\right] - E_{t-1}\left[V\left(\sum_{j=0}^{\infty} CF_{t+j} \,|I_{t-1}\right)\right]\right) \quad (3)$$

where CF_{t+j} denotes future cash flows, and $V(\cdot)$ denotes variance of cash flows, a proxy of cash-flow uncertainty. For simplicity, the price of risk λ is set as constant. The key variable is I_t, i.e., the information set available to investors at time *t*. The change of information set from day $t-1$ to day t measures information intensity of cash flows:

$$\Delta I_t = I_t - I_{t-1} \tag{4}$$

On a normal trading day with no significant news, the change of information set from day $t-1$ to day t is negligible. As such, there is little adjustment in expected stock returns. On the other hand, on days with material cash-flow news, there is a significant change in information set on day *t*. This also has a direct effect on the uncertainty of a firm's future cash flows. The literature documents that there is in general a reduction in information uncertainty following important corporate announcements (Ball and Brown, 1968; Kormendi and Lipe, 1987; Barth and So, 2014; and Dubinsky, Johannes, Kaeck and Seeger, 2019). For instance, Barth and So (2014) and Dubinsky, Johannes, Kaeck and Seeger (2019) show a clear drop in options implied volatility following earnings announcements.

As illustrated in Eq. (3), cash-flow news has a direct effect on a firm's cash-flow uncertainty and as such triggers investors to update their expectation of stock returns. As investors trade on updated information, both cash-flow news (Eq. (2)) and its impact on changes in expected stock returns (Eq. (3)) are concurrently incorporated into stock prices. Thus, following important corporate events, stock prices likely are more informative of expected stock returns or risk premium. The literature documents that information uncertainty tends to intensify prior to anticipated events (Patell and Wolfson, 1981; and Kalay and Lowenstein, 1985). As such, scheduled events tend to have a stronger effect in resolving information uncertainty. In addition, investors pay more attention to pre-scheduled or anticipated events (Ben-Rephael, Carlin, Da and Israelsen, 2021). Thus, in this study, we focus on the effect of expected information intensity.

III. Data and Methodology

A. Data

The data used in our empirical analysis include stock returns from Center for Research in Security Prices (CRSP), firm characteristics from Compustat, institutional ownership from Thomson-Reuters 13F filings, and analyst coverage from Thomas Reuters Institutional Brokers' Estimate System (IBES). The sample includes stocks with CRSP share code of 10, 11, 12, 18, 48 and 72, i.e., all common stocks and Real Estate Investment Trusts (REITs) listed on the US market. We exclude American Depository Receipts (ADRs), Exchange Traded Funds (ETFs), and closed-end funds. The sample period is from February 1982 to December 2020. The whole sample includes on average 3,308 stocks per month with 1,545,021 firm-month observations.

Firm characteristics used in the empirical analysis include size (LNSIZE), book-to-market ratio (LNBM), momentum (MOM), idiosyncratic volatility (IVOL), illiquidity ratio (ILLIQ), lagged returns (LRET), leverage ratio (LEV), institutional ownership (IO), analyst coverage (COV), and lagged earnings surprise (SUE). LNSIZE is the natural log of market capitalization at the end of June of a year. LNBM is the natural log of book-to-market ratio as defined in Fama and French (2008). MOM is the skip one-month lagged 11-month cumulative returns. IVOL is idiosyncratic volatility obtained from the Fama-French three-factor model estimated based on daily returns over previous month. ILLIQ is Amihud (2002) illiquidity ratio pre-multiplied by 1,000,000 based on daily returns over previous three months. LRET is lagged monthly return. LEV is leverage ratio calculated as total debt divided by the market value of the firm. IO is institutional ownership based on the most recent quarter. COV is analyst coverage defined as the number of analysts following the firm in the recent quarter. SUE is earnings surprise from a seasonal random walk model estimated using the most recent 20 quarters of data (Foster, Olsen and Shevlin, 1984). Table 1 reports time-series average of monthly cross-sectional statistics of firm characteristics.

Earnings announcement dates are obtained from both IBES and Compustat. Following Patton and Verardo (2012), we use IBES announcement date if the date has a valid announcement time. We adjust the announcement date to the next trading date if the announcement occurs after 16:00. For announcement dates with no precise announcement time, we use the earlier dates between IBES and Compustat (DellaVigna and Pollet, 2009). There are on average 3,087 earnings announcements per quarter with a total of 481,576 earnings announcements over the sample period. Corporate distribution announcement dates are obtained from the CRSP distribution file. We construct the sample following Bessembinder and Zhang (2015). Distribution events include cash dividend increases, special dividends, stock dividends and stock splits. Regular cash dividends are quarterly, semiannual or annual taxable dividends (CRSP distribution code "1232", "1242" and "1252"). To focus on informative dividend announcements, the dividend increase is required to be greater than 5% of the previous regular dividend. Special dividends are cash and taxable dividends (CRSP distribution code "1262" and "1272"). Stock dividends are identified by CRSP distribution code "5533". Stock splits (CRSP distribution code "5523") are required to have a split factor greater than 0.25. There are on average 235 distribution announcements per quarter with a total of 36,682 distribution announcements over the sample period. Merger and Acquisition announcement dates are obtained from Securities Data Corporation (SDC) platinum. We identify Merger and Acquisition announcement dates of acquiring firms for deals with more than $1 million transaction value and acquirers owning less than 50% of the target before the transaction (Ma, Whidbee and Zhang, 2019). There are on average 119 M&A announcements per quarter with a total of 18,541 M&A announcements over the sample.

B. Estimation of Earnings Announcement Risk and other Cash-flow Risk Measures

B.1. Earnings Announcement Beta (EA beta)

We estimate earnings announcement beta based on the excess covariance between stock returns and market returns at the earnings announcement window (Ball and Kothari, 1991). The main premise is that the excess co-movement between stock returns and market returns at the earnings announcement window reflects the extent of the systematic component in a firm's earnings shocks. Specifically, we perform the following regression for each stock *i*:

$$R_{i,t} = \alpha_i + \left(\beta_i + \beta_i^{EA} d^{EA}\right) R_{m,t} + \varepsilon_{i,t} \quad (5)$$

where $R_{i,t}$ is firm i's return in excess of risk-free rate, $R_{m,t}$ is excess market return, and dummy variable $d^{EA} = 1$ at earnings announcement window [-1,0,1] for stock i and zero otherwise. The three-day window is consistent with Ball and Kothari (1991). The model in Eq. (1) is a simple extension of the CAPM. In the same spirit of market beta, a higher β_i^{EA} implies higher systematic risk at the earnings announcement window. Each month, we obtain estimates of β_i^{EA}, based on past daily returns over a 3-year rolling window with at least 2 years of observations. Data on excess market return is obtained from Ken French's website. For convenience, we refer to β_i^{EA} as earnings announcement beta or EA beta.

To address the potential effect of nonsynchronous trading, we also estimate earnings announcement beta following Dimson (1979) by including lead and lag terms of market returns:

$$R_{i,t} = \alpha_i + \sum_{k=-1}^{1}[\left(\beta_{i,k} + \beta_{i,k}^{EA} d^{EA}\right) R_{m,t+k}] \ + \varepsilon_{i,t} \quad (6)$$

We denote earnings announcement beta based on the Dimson (1979) approach as $\beta_i^{EA(D)}$, where $\beta_i^{EA(D)} = \sum_{k=-1}^{1} \beta_{i,k}^{EA}$.

B.2. Other Measures of Cash-flow Risk

In our empirical analysis, we also implement other measures of cash-flow risk. One is the vector autoregression (VAR) implied cash-flow beta proposed in Campbell and Vuolteenaho (2004), Campbell, Polk and Vuolteenaho (2010), and Campbell, Giglio, Polk and Turley (2018). Campbell, Giglio, Polk, and Turley (2018) use a vector autoregression (VAR) model to capture time variation in expected returns and volatility. They derive the log stochastic discount factor (SDF) of intertemporal CAPM to incorporate stochastic volatility:

$$m_{t+1} - E_t m_{t+1} = -\lambda[r_{t+1} - E_t r_{t+1}] - (\lambda - 1)N_{DR,t+1} + \frac{1}{2}N_{RISK,t+1}$$

$$= -\lambda N_{CF,t+1} - \left[-N_{DR,t+1}\right] + \tfrac{1}{2}N_{RISK,t+1} \quad (7)$$

where m_{t+1} denotes log SDF, r_{t+1} denotes future log return, λ denotes the risk price, N_{CF} denotes cash-flow news, N_{DR} denotes discount-rate news, and N_{RISK} denotes volatility news. The log SDF is expressed by the market return, future discount rate, and risk news. The market return is then decomposed into cash-flow news and discount-rate news. Campbell and Vuolteenaho (2004) refer to beta associated with cash-flow news as "bad beta" and beta associated with discount-rate news as "good beta". The third term for volatility news captures the shocks to long-run expected volatility (Campbell, Giglio, Polk, and Turley, 2018).

To obtain the empirical estimates of the news terms, Campbell, Giglio, Polk, and Turley (2018) implement a first-order VAR model including six state variables: the real market return, expected market variance, price-smoothed earnings ratio, yield on the three-month Treasury bill, small-stock value spread, and default spread. Based on cash-flow news component (N_{CF}) and discount rate news component (N_{DR}) from Campbell, Giglio, Polk, and Turley (2018), the VAR cash-flow beta and VAR discount-rate beta are computed as:

$$\beta_i^{CF(VAR)} = \frac{Cov[r_{i,t}, N_{CF,t}]}{Var[r_{M,t} - E_{t-1} r_{M,t}]} \tag{8}$$

$$\beta_i^{DR(VAR)} = \frac{Cov[r_{i,t}, N_{DR,t}]}{Var[r_{M,t} - E_{t-1} r_{M,t}]} \tag{9}$$

The quarterly time series of three news terms are available up to 2011. We estimate individual stock VAR cash-flow beta and VAR discount-rate beta based on monthly returns and news terms of the most recent quarter using a 3-year rolling window with at least 18-month observations.

The other measure of cash-flow risk is directly based on a firm's quartely earnings. We obtain the quarterly net income of firm i ($CF_{i,t}$) from Compustat and the market capitalization ($P_{i.t}$) from CRSP. Earnings growth rate of individual stock is computed as $g_{i,t} = \frac{CF_{i,t} - CF_{i,t-4}}{P_{i,t-4}}$. Aggregate earnings growth rate is given by $agg\_g_t = \frac{agg\_cf_t - agg\_cf_{t-4}}{agg\_P_{t-4}}$, where agg_cf_t is aggregate earnings in quarter t and agg_P_{t-4} is aggregate market capitalization in quarter t-4. We then regress firm i's earnings growth rate on aggregate earnings growth rate:

$$g_{i,t} = \alpha_i + \beta_i^{QE} agg\_g_t + \varepsilon_{it} \tag{10}$$

The quarterly earnings beta (β_i^{QE}) is estimated over a 5-year rolling window with at least 6-quarter observations. We truncate beta estimates at 1% and 99% percentile to mitigate the effect of outliers.

Table 2 reports the estimates of EA beta, CAPM beta, VAR cash-flow beta, and quarterly earnings beta. For the whole sample, the average earnings announcement beta is 0.033 based on the simple model in Eq. (5) and 0.058 based on the Dimson (1979) approach in Eq. (6). The positive earnings announcement beta indicates that covariance between stock returns and market returns is on average higher on earnings announcement days, consistent with the evidence in Ball and Kothari (1991) and Patton and Verardo (2012). Based on an earlier sample period, Ball and Kothari (1991) document an increase of about 6.7% in market beta over the announcement window. Using intraday returns over the period from 1996 to 2006, Patton and Verardo (2012) estimate daily beta for constituent stocks of the S&P 500 index. They find that, on average, the market beta of these stocks increases by a statistically and economically significant amount of 0.16 on announcement days.

The results in Panel B show that small stocks on average have higher EA beta. The average $\beta^{EA(D)}$ based on Dimson (1979) is also noticeably higher than the average simple EA beta for small stocks, consistent with the effect of nonsynchronous trading. Small stocks have higher VAR cash-flow beta than big stocks, consistent with Campbell and Vuolteenaho (2004). For B/M subsamples in Panel C, growth stocks have higher EA beta than value stocks. In Panel D, we divide stocks according to long-term past performance, i.e., the skipping one-year past three-year returns. Long-term losers have lower EA beta than long-term winners. Similar to Da and Warachka (2009), quarterly earnings betas of past long-term losers are higher than those of past long-term winners. Panel E shows that EA beta is positively correlated with CAPM beta but is uncorrelated with VAR cash-flow beta or quarterly earnings beta.

C. Estimation of Expected Information Intensity

We construct an *ex ante* measure of expected information intensity (EII) based on recurrent corporate announcements. We include earnings and distribution events to estimate expected announcement dates because these events are recurrent and convey information about a firm's cash flows (Kalay and Loewenstein, 1985; So and Wang, 2014; and Bessembinder and Zhang, 2015). For earnings announcements, we follow So and Wang (2014) and calculate the expected earnings announcement date for each firm/fiscal quarter based on the median number of trading days between the calendar quarter-end and firm's earnings announcement date for the same fiscal quarter over the past 10 years. For distribution announcements, we calculate the expected distribution announcement date based on the number of days between the previous announcement and its preceding announcement. Bessembinder and Zhang (2015) show that follow-on distribution events tend to recur in 12 months. The expected event sample consists of 482,021 expected earnings announcement dates and 32,018 expected distribution announcement dates. Each month, we set the dummy variable EII to one if a firm has at least one expected corporate announcement and zero otherwise.

IV. Main Empirical Analysis

Based on our main conjecture, intensified cash-flow news has a direct effect on cash-flow uncertainty and induces changes in expected stock returns. In this section, we first test whether the realization of earnings announcement risk premium is conditional on high information intensity. We next examine the persistence of earnings announcement risk premium. As robustness checks, we perform regressions to control for firm characteristics and other measures of cash-flow risk.

A. EA Beta and Stock Returns: Effect of Expected Information Intensity

Each month, stocks are first divided into those with high EII and those with low EII. In each subsample, we then form quintile portfolios based on EA betas in the past month. For each portfolio, we calculate average equal-weighted and value-weighted returns. If the premium of earnings announcement risk is realized conditional on high information intensity, we expect the differences in abnormal returns between stocks in the top and bottom beta quintiles to be significantly positive among firms with high EII.

Panel A of Table 3 presents the results of quintile portfolios sorted on past EA beta separately for firms with high and low EII. Portfolio Q1 contains stocks with the lowest EA beta, while portfolio Q5 contains stocks with the highest EA beta. The results show that for firms with low EII, there is no significant relationship between stock returns and past EA beta. In contrast, for firms with high EII, the spreads in average returns, FF3, and FF5 alphas between the top and bottom quintiles are significantly positive. That is, stocks with high EA beta have significantly higher returns than stocks with low EA beta even after controlling for known risk factors (Fama and French, 2015). This finding is consistent with our conjecture that the premium of earnings announcement risk is realized when there is high information intensity of cash flows. Given that EII is an *ex ante* measure, it is feasible to devise a trading strategy of long stocks in the top quintile and short stocks in the bottom quintile of EA beta. The strategy yields a value-weighted monthly 0.58% (annualized 6.96%) Fama-French five-factor alpha.

As noted in the introduction, existing studies have documented a significant earnings announcement premium (Beaver, 1968; Ball and Kothari, 1991; Cohen, Dey, Lys, and Sunder, 2007; Frazzini and Lamont, 2007; Barber, De George, Lehavy, and Trueman, 2013; and Savor and Wilson, 2016). While earnings announcement risk premium measures return spreads between stocks with high earnings announcement risk and those with low earnings announcement risk, earnings announcement premium measures return spreads between announcing and non-announcing firms. Panel B of Table 3 presents average returns for firms with high EII and low EII. The results show that high-EII stocks significantly outperform low-EII stocks by 0.43% in monthly (annualized 5.16%) Fama-French five-factor alpha. This is consistent with the literature that stocks with earnings announcements on average earn higher returns.

Panels A and B illustrate that earnings announcement risk premium is clearly not driven by earnings announcement premium. In fact, the results in Panel C suggest that investors can exploit both earnings announcement risk premium and earnings announcement premium and generate even higher returns. As reported in Panel C of Table 3, a feasible enhanced strategy of long high EII stocks in the top EA beta quintile and short low EII stocks generates a value-weighted monthly 0.83% (annualized 9.96%) Fama-French five-factor alpha. The return of the enhanced strategy is almost double the announcement premium.

The other question is to what extent earnings announcement premium is driven by earnings announcement risk premium. To address the question, we first sort stocks based on EA beta. Then, within each EA beta quintile, we further divide stocks into those with high EII and those with low EII. Panel D of Table 3 reports the announcement premium, i.e., return spreads between high-EII stocks and low-EII stocks, in each EA beta quintile. If earnings announcement premium is driven by earnings announcement risk premium, we should expect earnings announcement premium to be significant only in top EA beta quintiles. The results show that other than the bottom EA beta quintile, earnings announcement premium is significant and pervasive in all other EA beta quintiles. After controlling for EA beta, the average return spreads between stocks with high EII and those with low EII remain significant. That is, the earnings announcement risk premium is distinct from the well-documented announcement premium in the literature.

We next examine the persistence of return-predictive power of EA beta. Given that earnings announcement beta captures an important source of systematic risk in a firm's fundamentals, we expect the positive relation between EA beta and stock returns to be persistent. Each month t, we identify firms with high EII in each of the following 12 months. We then form quintile portfolios for each subsample of high EII stocks based on EA beta estimated in month t. Table 4 reports average returns of each quintile portfolio and return spreads between the top and bottom quintiles over subsequent 3 months ([t+1, t+3]) in Panel A, 6 months ([t+1, t+6]) in Panel B, and 12 months ([t+1, t+12]) in Panel C. The results show that among stocks with high EII, those with high EA beta consistently outperform those with low EA beta up to 12-month horizon. That is, EA beta has a persistent positive relation with stock returns conditional on high information intensity.

In Appendix A, we also replicate Table 3 using actual corporate announcements. Based on announcement dates, we identify stocks with earnings or distribution announcements and those without in month t+1. For each subsample, we then sort stocks based on EA beta estimated in month t. The results in Table A1 are consistent with those in Table 3. Panel A of Table A1 shows that while there is no significant relation between EA beta and stock returns among non-announcing firms, there is a significantly positive relation between EA beta and stock returns among announcing firms. Panel B of Table A1 shows a significant announcement premium. That is, announcing firms significantly outperform non-announcing firms. The results in Panel C of Table A1 show that an enhanced trading strategy of long announcing firms with high EA beta and short non-announcing firms generates a value-weighted monthly 1.11% (annualized 13.32%) Fama-French five-factor alpha. The return is higher than that in Panel C of Table 3. Nevertheless, we note that the strategy is infeasible since it is based on future announcement dates.

B. Robustness Checks: Multivariate Regressions

The results in the above section show that when stocks have high EII, those with high earnings announcement risk earn significantly higher returns. The positive relation is persistent up to 12-month horizon. The findings support the conjecture that the premium of earnings announcement risk is realized when there is high information intensity of cash flows. As a robustness check of our main findings, we perform the following Fama-MacBeth (1973) cross-sectional regressions by controlling for various firm characteristics:

$$R_{i,t+1} = \gamma_{0,t} + \gamma_{1,t} d_{i,t+1}^{HEII} \hat{\beta}_{i,t}^{EA} + \gamma_{2,t} d_{i,t+1}^{LEII} \hat{\beta}_{i,t}^{EA} + \gamma_{3,t} d_{i,t+1}^{HEII} + Controls + \varepsilon_{i,t} \tag{11}$$

where $\hat{\beta}_{i,t}^{EA}$ is earnings announcement beta in month t. $d_{i,t+1}^{HEII}$ is a dummy variable for firms with high EII, defined as $d_{i,t+1}^{HEII} = 1$ if firm i has an expected earnings or distribution announcement in month t+1. $d_{i,t+1}^{LEII}$ is a dummy variable for firms with low EII, defined as $d_{i,t+1}^{LEII} = 1$ if firm i has no expected announcement in month t+1. The coefficient (γ_1) of the interaction term between d^{HEII} and $\hat{\beta}^{EA}$ is the price associated with earnings announcement risk for firms with high EII. The coefficient (γ_2) of the interaction term between d^{LEII} and $\hat{\beta}^{EA}$ is the price of earnings announcement risk for firms with low EII. γ_3 is the coefficient of high EII dummy, which captures the announcement premium. Control variables include β^{CAPM}, LNSIZE, LNBM, MOM, IVOL, ILLIQ, LRET, LEV, IO, and COV. The literature documents evidence of investor underreaction to earnings surprises (Ball and Brown, 1968; and Bernard and Thomas, 1989). To ensure that our finding is not induced by investor underreaction to earnings surprises, we also include lagged earnings surprises (SUE) as a control variable. For details on the construction of all control variables, please refer to Section II.A.

Table 5 reports the results of Fama-MacBeth cross-sectional regressions in Eq. (11) and Newey-West t-statistics with 12 lags. The results in columns (1) and (2) show that the coefficient of high EII dummy d^{HEII} is significantly positive, evidence of announcement premium. Stock returns are negatively related to LNSIZE, IVOL, LRET, and LEV and positively related to LNBM, MOM, ILLIQ, COV and SUE. More importantly, we find a significantly positive relation between past EA beta and monthly stock returns during months when firms have expected cash-flow news. The average coefficient of EA beta for firms with high EII is 0.151% with a t-statistic of 3.68. The coefficient remains positive and significant after controlling for firm characteristics. In contrast, the coefficient of EA beta is insignificant for firms with low EII.

We also perform the following panel regressions where standard errors are clustered by time:

$$R_{i,t+1} = \gamma_0 + \gamma_1 d_{i,t+1}^{HEII} \hat{\beta}_{i,t}^{EA} + \gamma_2 d_{i,t+1}^{LEII} \hat{\beta}_{i,t}^{EA} + \gamma_3 d_{i,t+1}^{HEII} + Controls + \delta_t + \varepsilon_{i,t} \quad (12)$$

where δ_t denotes time-fixed effects for each month. Other variables are the same as those in Eq. (11). Columns (3) and (4) of Table 5 report the results of panel regression and show that the coefficient of EA beta is positive and significant for firms with high EII. Again, the coefficient of EA beta is insignificant for firms with low EII.

To address the issue of nonsynchronous trading, we estimate EA beta following Dimson (1979) with one lead and one lag of market returns in Eq. (6). We replicate the regressions in both Eq. (11) and Eq. (12) using the Dimson (1979) earnings announcement beta ($\beta^{EA(D)}$). The results, reported in Table A2 of Appendix A, are similar to those in Table 5.

The above analyses are based on *ex ante* expected information intensity or anticipated corporate announcements. As a further robustness check, we identify firms with actual announcements in month t+1 and replicate the regressions in both Eq. (11) and Eq. (12). The results in Panel A of Table A3 in Appendix A are based on earnings and distribution announcements in month t+1. The results show that for firms with announcements, there is a positive and significant earnings announcement risk premium. To address the concern that the results may be driven by only earnings announcements, we replicate the analysis based on distribution and M&A announcements. The results in Panel B of Table A3 show that for firms with distribution or M&A announcements, there is also a significantly positive earnings announcement risk premium.

C. Robustness Checks: Other Measures of Cash-flow Risk

We also include other cash-flow risk measures in the multivariate regressions, namely the VAR cash-flow beta and quarterly earnings beta. The analysis serves two purposes. First, we are interested in whether other measures of cash-flow risk has predictive power of stock returns. Second and more importantly, we are interested in whether one measure subsumes the predictive power of the other.

Table 6 reports the tests based on both VAR cash-flow beta and VAR discount-rate beta. As shown in columns (3)-(4) of Table 6, our main results are robust after controlling for VAR cash-flow beta and VAR discount-rate beta. The results in column (3) show that the coefficient of VAR cash-flow beta is positive and weakly significant. That is, stocks with VAR cash-flow beta earn significantly higher returns, consistent with Campbell and Vuolteenaho (2004). Table 7 presents the results based on quarterly earnings beta. In all regressions, the coefficients of quarterly earnings betas are insignificant. The premium of earnings announcement risk remains positive and significant after controlling for quarterly earnings beta.

V. Further Analysis

The underlying mechanism of our argument is that high information intensity and investor consumption of information trigger the pricing of earnings announcement risk. To substantiate our argument, we perform further analyses to examine the effect of information production and investor information consumption.

A. Earnings Announcement Risk and Announcement Returns

To sharpen our measure of information intensity, we focus only on firms with actual announcements. We zoom into the announcement window and focus on stock returns around the announcement date. If risk premium is indeed concentrated on days with high information intensity, higher returns for stocks with high EA beta should be realized mostly at the announcement window. We decompose monthly stock returns into announcement returns and non-announcement returns. Announcement returns are calculated as cumulative returns at the earnings, distribution, or M&A announcement window. Then we regress announcement returns and non-announcement returns separately on EA beta and other control variables:

$$AR_{i,t+1} = \gamma_{0,t+1}^{A} + \gamma_{1,t+1}^{A}\hat{\beta}_{i,t}^{EA} + Controls + \varepsilon_{i,t+1}^{A} \tag{13}$$

$$NAR_{i,t+1} = \gamma_{0,t+1}^{N} + \gamma_{1,t+1}^{N}\hat{\beta}_{i,t}^{EA} + Controls + \varepsilon_{i,t+1}^{N} \tag{14}$$

where AR_{it} is announcement return defined as cumulative stock return over announcement window [-1,4]. We use an extended event window to allow for the accumulation of risk premium following the announcement. We confirm that the results are similar when we vary announcement window by one or two days. NAR_{it} is non-announcement return defined as monthly return excluding announcement return.

Table 8 presents the results of Fama-MacBeth cross-sectional regressions in Eq. (13) and (14). In columns (1)-(4) of Table 8 where announcement return is the dependent variable, we find that the coefficient of EA beta is positive and significant. In contrast, in columns (5)-(8) of Table 8 where non-announcement return is the dependent variable, the coefficient of EA beta is insignificant. Based on the results of Table 8 (column (1)), there is an implied earnings announcement risk premium of 9.1 bps (0.091%) over the six-day earnings announcement window [-1,4]. The findings suggest that the premium of earnings announcement risk is mostly accrued around the date of corporate announcements. Interestingly, we notice that during months when firms have high information intensity, the coefficient of CAPM beta is significantly negative around announcement days (column (1)-(4) of Table 8) but positive on other days (column (5)-(8) of Table 8). The size, value, idiosyncratic volatility, and illiquidity premium are also concentrated around the announcement date, consistent with the evidence in Jiang and Yao (2013) and Engelberg, McLean and Pontiff (2018). We also confirm that the coefficient of SUE is significantly positive if we change the announcement window to [-1, 1].

In addition, as shown in columns (1)-(4) of Table 8, the premium of VAR cash-flow beta is also concentrated on days around corporate announcements. Compared to the results in Table 6, almost 70% of the VAR cash-flow beta premium is accrued over the announcement window. Recall that VAR cash-flow beta of Campbell and Vuolteenaho (2004) focuses on long-term risk of cash flows. This finding strengthens our argument that risk premium in general is likely realized following important corporate events. The fact that earnings announcement risk premium and VAR cash-flow beta premium are both associated with high information intensity suggests that our findings are unlikely mechanical. The results in Table 8 also confirm that earnings announcement beta and VAR cash-flow beta capture different aspects of cash-flow risk.

To further alleviate the concern that the results are mostly driven by earnings announcements, we replicate the analysis in Table 8 by excluding earnings announcements. The results based on distribution and M&A announcements are reported in Table B1 of Appendix B. As expected, the coefficient estimates of β^{EA} has lower statistical significance due to fewer observations. Nevertheless, the results show that the relation between EA beta and announcement returns remains significantly positive.

B. Non-announcing Connected Firms and Spillover Effect

Ben-Rephael, Carlin, Da and Israelsen (2021) show that investor information consumption may spill over from announcing firms to non-announcing firms. Patton and Verardo (2012) argue that investors extract the common component from individual firm's earnings shocks and revise their expectations on aggregate cash flows. As a result, investors not only revise their expectations of earnings growth of announcing firms but also those of related firms. The combination of information spillover and investor information consumption suggests that the risk premium is realized not only for announcing firms but also for non-announcing connected firms.

Each month, for each announcing firm, we identify a non-announcing connected firm. The procedure starts by matching each firm in the announcing sample, starting from the smallest to the largest size, with a non-announcing firm in the same industry with smallest size difference. Industry classification is based on the four-digit SIC code. We end up with 378,201 matched firm-month pairs, which represents 74% of the sample of announcing firms. We calculate returns of non-announcing connected firms over the announcement window of announcing firms.

As shown in Table 9, earnings announcement risk of non-announcing connected firms is also positively and significantly priced. We also shift the event window one day later over [0, 5]. Based on [0,5] announcement window, earnings announcement beta coefficient is even higher for non-announcing connected firms and more significant at 0.040% with a t-statistic of 2.45. This implies a potential time-lag of information consumption spillover and a delayed effect for non-announcing firms. The finding that earnings announcement risk premium is earned for non-announcing connected firms during times when a related firm updates cash-flow information is consistent with our hypothesis. When investors trade on updated cash-flow news, risk premium is also incorporated into stock prices for non-announcing connected firms.

C. Effect of Investor Attention

In this section, we construct measures of investor trading activities and examine the effect of information consumption on earnings announcement risk premium. We use log excess turnover and log excess trading volume to proxy for investor trading activities. Trading volume and turnover are also considered as investor attention measures (Gervais, Kaniel and Mingelgrin, 2001; Barber and Odean, 2008; and Hou, Xiong, and Peng, 2009). Prior studies suggest that high investor attention gives rise to price efficiency. We define log excess turnover (LNETO) and log excess trading volume (LNETV) as follows:

$$LNETO_{i,t+1} = Ln\left(\frac{TO_{i,t+1_{[-1,4]}}}{TO_{i,[t,t-1]}}\right) \tag{15}$$

$$LNETV_{i,t+1} = Ln\left(\frac{TV_{i,t+1_{[-1,4]}}}{TV_{i,[t,t-1]}}\right) \tag{16}$$

where $TO_{i,[t,t-1]}$ is calculated as average daily turnover over two months before month t+1 when firm i releases announcement, and $TO_{i,t+1_{[-1,4]}}$ is average daily turnover over the announcement window [-1, 4] for firm i. The measures based on trading volume, $TV_{i,[t,t-1]}$ and $TV_{i,t+1_{[-1,4]}}$, are similarly defined. We divide firms with announcements in a given month into those with high and low investor attention based on cross-sectional median of average daily turnover and trading volume over the announcement window.

The results in Table 10 show that the premium of earnings announcement risk is significantly positive over the announcement window [-1,4] for firms with high excess turnover. We find similar results using excess trading volume. Our results confirm that more trading activities by investors during information events help incorporate earnings announcement risk into stock prices.

D. Effect of Earnings Uncertainty

In this section, we examine the effect of earnings uncertainty on the pricing of earnings announcement risk. For firms with high earnings uncertainty, we expect a stronger effect on earnings announcement risk premium. We argue that for these firms, updated cash-flow news is likely to have a stronger effect in resolving cash-flow uncertainty.

We use standard deviation of historical earnings surprises as the first proxy for earnings uncertainty (Zhang, 2006). We divide firms with announcements in a given month into those with high and low earnings uncertainty according to the cross-sectional median. The dummy variable of high earnings uncertainty (d^{HEU}) equals 1 for firms with high standard deviations of historical earnings surprises and zero otherwise. The low earnings uncertainty dummy (d^{LEU}) is defined as 1- d^{HEU}. Columns (1) and (2) of Table 11 show that the relation between EA beta and announcement returns is stronger for firms with higher earnings uncertainty. The coefficient of EA beta is 0.121% (t-statistic of 2.78) for firms with higher earnings uncertainty.

We also use analyst coverage as another proxy for earnings uncertainty. Firms with low analyst coverage are likely to have higher earnings uncertainty. We follow Hong, Lim and Stein (2000) and use residual analyst coverage adjusted for firm size. The high earnings uncertainty dummy is defined as d^{HEU}=1 if the firm has residual analyst coverage lower than the cross-sectional median. Columns (3) and (4) of Table 11 show that the coefficients of EA beta are positive and highly significant for low residual analyst coverage firms. The implied premium of earnings announcement risk is 0.130% over announcement window [-1,4] with a t-statistic of 3.50 for firms with low analyst coverage or high earnings uncertainty.

VI. Conclusion

In this paper, we investigate whether earnings announcement risk, an important systematic risk associated with firm fundamentals, is priced by investors. We estimate earnings announcement risk based on excess covariance between stock returns and market returns at the earnings announcement window. We find that for firms with high information intensity of cash flows, stock returns have a significantly positive relation with past earnings announcement beta. We interpret the finding as evidence that when there is intensified cash-flow news, investors update their expectation of stock returns and incorporate risk premium into stock prices. Consistent with the conjecture, we further show that the premium of earnings announcement risk is concentrated around the date of corporate announcements. We show that both information production and investor information consumption are essential in attaining efficient asset prices.

Existing studies have documented that expected returns and abnormal returns are often concentrated on days of important corporate events. The literature generally deems such findings as puzzling and hard to reconcile with existing asset pricing theories. The mechanism proposed in our study for the realization of risk premium sheds important light on asset return dynamics. We argue that cash-flow news propagates in a discrete process with time-varying intensity. As cash-flow news intensifies, it helps resolve cash-flow uncertainty and revises expectation of stock returns. Thus, on corporate announcement days, both expected returns associated with cash-flow risk and abnormal returns driven by unexpected cash-flow news are concurrently incorporated into stock prices. To understand whether the market is efficient in pricing important risk factors, it is important to focus on periods with high information intensity.

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Table 1. Summary Statistics

This table reports time series average of monthly cross-sectional statistics of firm characteristics. LNSIZE and LNBM are the natural log of market capitalization and the natural log of book-to-market ratio as defined in Fama and French (2008). MOM is momentum calculated as skip 1-month lagged 11-month cumulative returns. IVOL is idiosyncratic volatility in percentage relative to Fama-French three-factor model estimated based on daily returns over previous month. ILLIQ is Amihud (2002) illiquidity ratio pre-multiplied by 1,000,000 based on daily returns over previous three months. LRET is lagged monthly return. LEV is leverage ratio calculated as total debt divided by the market value of the firm. IO is institutional ownership based on the most recent quarter. COV is analyst coverage defined as the number of analysts following the firm in the recent quarter. SUE is earnings surprise in the recent quarter based on seasonal random walk model. N denotes average number of observations of each variable. The sample period is from February 1982 to December 2020.

Variable	N	Mean	St.Dev	25%	Median	75%
LNSIZE	3,308	5.776	1.881	4.366	5.698	7.089
LNBM	3,308	-0.556	0.787	-1.007	-0.463	-0.031
MOM	3,308	0.127	0.452	-0.139	0.072	0.304
IVOL	3,308	2.602	1.839	1.382	2.090	3.233
ILLIQ	3,308	1.623	6.161	0.007	0.061	0.596
LRET	3,308	0.011	0.121	-0.053	0.005	0.067
LEV	3,308	0.261	0.233	0.050	0.209	0.419
IO	3,308	0.449	0.263	0.225	0.465	0.665
COV	3,308	4.088	5.065	0.458	2.161	5.725
SUE	3,308	-0.002	0.065	-0.007	0.001	0.007

Table 2. Earnings Announcement Beta, CAPM Beta and Alternative Cash-flow Risk Measures

Panel A reports the time series average of monthly cross-sectional statistics of EA beta, Dimson (1979) EA beta, CAPM beta, VAR cash-flow beta and quarterly earnings beta for the full sample. Panels B, C and D report the statistics for size, B/M, and long-term return subsamples. Each month, stocks are divided into small and big, high and low, and long-term loser and winner based on the median of size, book-to-market ratio and skipping 1-year past 3-year cumulative return, respectively. Panel E reports the time series average of cross-sectional correlation. Each month EA beta (β^{EA}) for each firm is estimated from the model $R_{i,t} = \alpha_i + \left(\beta_i + \beta_i^{EA} d^{EA}\right) R_{m,t} + \varepsilon_{it}$ based on daily returns over 3-year rolling window with at least 2 years of observations. Dummy variable $d^{EA} = 1$ at announcement window [-1,0,1] and zero otherwise. R_{it} is firm i's return in excess of risk-free rate. R_{mt} is market return in excess of risk-free rate. Dimson (1979) EA beta ($\beta^{EA(D)}$) is estimated from the model $R_{i,t} = \alpha_i + \sum_{k=-1}^{1}[\left(\beta_{i,k} + \beta_{i,k}^{EA} d^{EA}\right) R_{m,t+k}] \; + \varepsilon_{i,t}$, where $\beta_i^{EA(D)} = \sum_{k=-1}^{1} \beta_{i,k}^{EA}$. CAPM beta ($\beta^{CAPM}$) is estimated from the market model based on daily returns over 3-year rolling window. VAR cash-flow beta ($\beta^{CF(VAR)}$) is estimated based on monthly returns over 3-year rolling window where cash-flow news and discount-rate news components are obtained from Campbell, Giglio, Polk and Turley (2018). The data is available over the sample period from 1980 to 2011. Quarterly earnings beta (β^{QE}) is estimated based on a firm's quarterly earnings growth and aggregate quarterly earnings growth over 5-year rolling window. The sample period is from February 1982 to December 2020.

Panel A: Full Sample

Variable	N	Mean	St.Dev	25%	Median	75%
β^{EA}	3,308	0.033	0.848	-0.425	0.014	0.484
$\beta^{EA(D)}$	3,308	0.058	1.534	-0.735	0.034	0.835
β^{CAPM}	3,308	0.830	0.461	0.498	0.799	1.116
$\beta^{CF(VAR)}$	3,314	0.032	0.154	-0.059	0.025	0.116
β^{QE}	3,286	1.215	8.104	-0.545	0.272	1.700

Panel B: Size Subsamples

Variable	N	Mean	St.Dev	25%	Median	75%
Small						
β^{EA}	1,654	0.035	0.961	-0.520	0.018	0.581
$\beta^{EA(D)}$	1,654	0.069	1.744	-0.881	0.043	0.999
β^{CAPM}	1,654	0.694	0.455	0.335	0.644	0.989
$\beta^{CF(VAR)}$	1,657	0.046	0.172	-0.058	0.040	0.145
β^{QE}	1,643	1.417	9.636	-0.991	0.347	2.398
Big						
β^{EA}	1,654	0.031	0.716	-0.357	0.011	0.409
$\beta^{EA(D)}$	1,654	0.048	1.285	-0.628	0.027	0.706
β^{CAPM}	1,654	0.966	0.416	0.661	0.917	1.214
$\beta^{CF(VAR)}$	1,657	0.018	0.130	-0.058	0.013	0.089
β^{QE}	1,642	1.013	6.140	-0.297	0.231	1.212

Panel C: B/M Subsamples

Variable	N	Mean	St.Dev	25%	Median	75%
High						
β^{EA}	1,654	0.026	0.832	-0.410	0.008	0.453
$\beta^{EA(D)}$	1,654	0.046	1.501	-0.707	0.026	0.779
β^{CAPM}	1,654	0.719	0.440	0.380	0.691	1.002
$\beta^{CF(VAR)}$	1,657	0.030	0.145	-0.056	0.023	0.110
β^{QE}	1,646	1.649	9.134	-0.684	0.425	2.422
Low						
β^{EA}	1,654	0.040	0.862	-0.442	0.021	0.518
$\beta^{EA(D)}$	1,654	0.071	1.563	-0.765	0.044	0.896
β^{CAPM}	1,654	0.940	0.444	0.629	0.906	1.218
$\beta^{CF(VAR)}$	1,657	0.033	0.160	-0.062	0.027	0.121
β^{QE}	1,640	0.780	6.785	-0.443	0.190	1.183

Panel D: Long-term Return Subsamples

Variable	N	Mean	St.Dev	25%	Median	75%
Loser						
β^{EA}	1,611	0.022	0.905	-0.484	0.003	0.521
$\beta^{EA(D)}$	1,611	0.030	1.646	-0.847	0.011	0.888
β^{CAPM}	1,611	0.806	0.456	0.469	0.784	1.097
$\beta^{CF(VAR)}$	1,616	0.031	0.156	-0.062	0.025	0.118
β^{QE}	1,610	1.546	9.045	-0.702	0.385	2.307
Winner						
β^{EA}	1,612	0.042	0.773	-0.372	0.022	0.447
$\beta^{EA(D)}$	1,612	0.084	1.383	-0.634	0.052	0.778
β^{CAPM}	1,612	0.846	0.445	0.525	0.813	1.128
$\beta^{CF(VAR)}$	1,617	0.033	0.146	-0.054	0.025	0.112
β^{QE}	1,611	0.895	6.617	-0.439	0.218	1.289

Panel E: Cross-sectional Correlation

Variable	β^{EA}	$\beta^{EA(D)}$	β^{CAPM}	$\beta^{CF(VAR)}$	β^{QE}
β^{EA}	1	0.502***	0.037***	-0.003	-0.002
$\beta^{EA(D)}$		1	0.021***	-0.010**	-0.002
β^{CAPM}			1	-0.049*	0.051***
$\beta^{CF(VAR)}$				1	-0.035***
β^{QE}					1

Table 3. Returns of Portfolios sorted on Earnings Announcement Beta

Each month t, stocks are first divided into those with high and low expected information intensity (EII) in month t+1. Within each subsample, stocks are then sorted into quintile portfolios based on earnings announcement beta in month t. We estimate expected announcement dates for recurrent events including earnings and distribution announcements. Following So and Wang (2014), expected earnings announcement dates for each firm/fiscal quarter are based on the median number of trading days between the calendar quarter end and firm's earnings announcement date for the same fiscal quarter over the past 10 years. Expected distribution announcements are based on the number of days between the previous announcement and its preceding announcement. Firms with expected corporate announcements are classified as having high EII and those without are classified as having low EII. Quintile Q1 (5) consists of stocks with the lowest (highest) EA betas. Panel A reports average returns and Fama-French three- and five-factor alphas in month t+1 for quintile portfolios. The panel also reports return and alpha spreads between the top and bottom quintiles. Panel B reports average returns and alphas for firms with high and low EII in month t+1 as well as their differences. Panel C reports return spreads between portfolio of firms with high EII in month t+1 in the top EA beta quintile and portfolio of firms with low EII in month t+1. In Panel D, stocks are first sorted into quintile portfolios based on EA beta in month t. The panel reports differences in average returns and alphas between firms with high and low EII in each quintile. N is the average number of firms in each quintile. The t-statistics are based on Newey-West standard errors with three lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Returns of Portfolios sorted on EA Beta

β^{EA} Quintile	N	Equal-weighted Return			Value-weighted Return		
		Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
					Firms with High EII		
Q1	214	1.30	0.06	0.16	1.13	0.02	0.10
Q2	215	1.32	0.21	0.17	1.29	0.27	0.23
Q3	215	1.46	0.38	0.35	1.38	0.35	0.29
Q4	215	1.48	0.35	0.31	1.36	0.32	0.25
Q5	214	1.62	0.39	0.47	1.62	0.48	0.68
Q5-Q1		0.32***	0.32***	0.31***	0.48***	0.46**	0.58***
(t-Stat)		(3.52)	(3.67)	(3.21)	(2.64)	(2.55)	(2.78)
					Firms with Low EII		
Q1	447	1.27	0.04	0.18	1.03	-0.14	-0.06
Q2	447	1.13	0.00	-0.01	1.01	-0.06	-0.13
Q3	447	1.14	0.04	0.01	0.95	-0.09	-0.16
Q4	447	1.20	0.05	0.05	0.80	-0.23	-0.30
Q5	447	1.26	0.02	0.15	1.04	-0.09	0.02
Q5-Q1		-0.01	-0.02	-0.03	0.00	0.06	0.09
(t-Stat)		(-0.26)	(-0.52)	(-0.59)	(0.04)	(0.48)	(0.71)

Panel B: Announcement Premium – Average Returns of Firms with High and Low EII

	N	Equal-weighted Return			Value-weighted Return		
		Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
High EII	1,072	1.44	0.28	0.29	1.34	0.28	0.28
Low EII	2,236	1.20	0.03	0.08	0.94	-0.13	-0.15
Diff		0.24***	0.25***	0.21***	0.40***	0.41***	0.43***
(t-Stat)		(3.92)	(3.84)	(3.02)	(5.04)	(4.91)	(4.79)

Panel C: Enhanced Strategy based on High EII Firms in the Top β^{EA} Quintile and Low EII Firms

	N	Equal-weighted Return			Value-weighted Return		
		Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
Top β^{EA} Quintile & High EII	214	1.62	0.39	0.47	1.62	0.48	0.68
Low EII	2,236	1.20	0.03	0.08	0.94	-0.13	-0.15
Diff		0.42***	0.36***	0.39***	0.68***	0.61***	0.83***
(t-Stat)		(4.36)	(4.01)	(4.02)	(3.64)	(3.45)	(3.83)

Panel D: Announcement Premium across EA Beta Quintiles

β^{EA} Quintile	Number of High EII Firms	Number of Low EII Firms	Equal-weighted Return			Value-weighted Return		
			Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
Q1	209	452	0.06	0.05	0.00	0.17	0.24*	0.29*
			(0.62)	(0.49)	(0.04)	(1.30)	(1.67)	(1.94)
Q2	217	445	0.21**	0.23***	0.21**	0.31***	0.36***	0.35***
			(2.53)	(2.71)	(2.47)	(2.65)	(3.00)	(2.73)
Q3	219	443	0.37***	0.39***	0.37***	0.46***	0.45***	0.46***
			(5.06)	(4.91)	(4.71)	(4.42)	(3.96)	(4.27)
Q4	217	445	0.27***	0.30***	0.26***	0.56***	0.55***	0.54***
			(3.67)	(3.87)	(3.21)	(4.22)	(4.15)	(4.28)
Q5	210	452	0.38***	0.37***	0.32***	0.56***	0.54***	0.62***
			(4.75)	(4.45)	(3.37)	(3.44)	(3.31)	(3.10)
Q5-Q1			0.32***	0.32***	0.31***	0.39*	0.30	0.34
(t-Stat)			(3.24)	(3.31)	(2.94)	(1.96)	(1.50)	(1.49)
Average Announcement Premium across EA Beta Quintiles								
	Average		0.26***	0.27***	0.23***	0.41***	0.43***	0.45***
	(t-Stat)		(4.45)	(4.29)	(3.53)	(5.47)	(5.33)	(5.09)

Table 4. Persistence of Earnings Announcement Beta Premium

Each month, we identify firms with high EII in each of the following 12 months and form quintile portfolios based on EA beta estimated in month t. Quintile Q1 (5) consists of stocks with the lowest (highest) EA betas. The table reports average returns and Fama-French three- and five-factor alphas over months t+1 to t+3, months t+1 to t+6, and months t+1 to t+12. The table also reports return and alpha spreads between the top and bottom quintiles. The t-statistics are based on Newey-West standard errors with three lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Average Returns from Month t+1 to Month t+3 of Portfolios sorted on EA Beta

β^{EA} Quintile	Equal-weighted Return			Value-weighted Return		
	Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
Q1	1.36	0.01	0.13	1.39	0.07	0.18
Q2	1.35	0.17	0.13	1.38	0.22	0.22
Q3	1.49	0.36	0.27	1.56	0.43	0.35
Q4	1.50	0.32	0.27	1.55	0.39	0.33
Q5	1.66	0.37	0.41	1.78	0.52	0.62
Q5-Q1	0.31***	0.36***	0.28***	0.39***	0.44***	0.45***
(t-Stat)	(3.73)	(4.38)	(3.08)	(3.86)	(4.44)	(3.68)

Panel B: Average Returns from Month t+1 to Month t+6 of Portfolios sorted on EA Beta

β^{EA} Quintile	Equal-weighted Return			Value-weighted Return		
	Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
Q1	1.43	0.03	0.12	1.50	0.13	0.19
Q2	1.39	0.16	0.10	1.45	0.23	0.19
Q3	1.53	0.37	0.29	1.63	0.47	0.39
Q4	1.54	0.34	0.26	1.62	0.45	0.36
Q5	1.67	0.35	0.38	1.82	0.51	0.59
Q5-Q1	0.24***	0.32***	0.26***	0.32***	0.38***	0.40***
(t-Stat)	(3.89)	(5.46)	(3.39)	(4.23)	(5.29)	(4.17)

Panel C: Average Returns from Month t+1 to Month t+12 of Portfolios sorted on EA Beta

β^{EA} Quintile	Equal-weighted Return			Value-weighted Return		
	Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
Q1	1.48	0.10	0.12	1.59	0.25	0.26
Q2	1.45	0.19	0.08	1.53	0.28	0.18
Q3	1.54	0.38	0.22	1.66	0.50	0.33
Q4	1.57	0.35	0.19	1.67	0.51	0.32
Q5	1.68	0.36	0.27	1.84	0.56	0.53
Q5-Q1	0.20***	0.26***	0.15**	0.25***	0.30***	0.26***
(t-Stat)	(4.40)	(5.47)	(2.44)	(4.61)	(5.42)	(3.34)

Table 5. Earnings Announcement Beta and Stock Returns: Multivariate Regressions

The table reports the results of regressions of monthly stock returns in month t+1 on lagged EA beta interacting with high and low expected information intensity (EII) dummy variables, and other control variables. Columns (1) and (2) report the results of Fama-MacBeth cross-sectional regressions. Columns (3) and (4) report the results of panel regressions with time fixed effects. EA beta (β^{EA}) is estimated based on daily returns over the 3-year rolling window with at least 2 years of observations. d^{HEII} is the dummy variable for firms with high EII, which equals 1 if a firm has expected announcement in month t+1 and 0 otherwise. d^{LEII} is the dummy variable for firms with low EII, defined as 1-d^{HEII}. Control variables include CAPM beta (β^{CAPM}), the natural log of market capitalization (LNSIZE), the natural log of book-to-market ratio (LNBM), momentum (MOM), idiosyncratic volatility (IVOL), illiquidity ratio (ILLIQ), lagged returns (LRET), leverage ratio (LEV), institutional ownership (IO), analyst coverage (COV) and standardized earnings surprise (SUE) estimated from a seasonal random walk model. For Fama-MacBeth regressions, the t-statistics are based on Newey-West standard errors with 12 lags. For panel regressions, the t-statistics are based on standard errors clustered by time. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Fama-MacBeth Regression		Panel Regression	
	(1)	(2)	(3)	(4)
$\beta^{EA}*d^{HEII}$	0.151***	0.127***	0.093***	0.089***
	(3.68)	(3.12)	(3.23)	(3.07)
$\beta^{EA}*d^{LEII}$	-0.006	0.000	0.003	0.002
	(-0.30)	(0.02)	(0.14)	(0.12)
d^{HEII}	0.237***	0.284***	0.171**	0.173**
	(4.94)	(6.47)	(2.22)	(2.40)
β^{CAPM}		0.070		0.054
		(0.30)		(0.20)
LNSIZE		-0.224***		-0.228***
		(-2.66)		(-3.19)
LNBM		0.159***		0.227***
		(2.91)		(3.19)
MOM		0.502**		0.411
		(2.30)		(1.33)
IVOL		-0.149**		-0.077
		(-2.42)		(-0.77)
ILLIQ		0.083***		0.021***
		(4.32)		(3.33)
LRET		-4.733***		-4.064***
		(-11.06)		(-3.83)
LEV		-0.562**		-0.476**
		(-2.38)		(-2.01)
IO		0.075		0.067
		(1.57)		(1.10)
COV		0.066*		0.087**
		(1.78)		(2.15)
SUE		0.193***		0.192***
		(6.14)		(4.60)
INTERCEPT	1.198***	1.138***	1.180***	1.352***
	(4.83)	(5.74)	(4.72)	(6.18)
N	1,545,021	1,545,021	1,545,021	1,545,021
Adj. R^2	0.002	0.062	0.126	0.128

Table 6. VAR Cash-flow Beta and Stock Returns

The table reports the results of Fama-MacBeth regressions of monthly stock returns in month t+1 on lagged VAR cash-flow beta and other control variables. VAR cash-flow beta ($\beta^{CF(VAR)}$) and VAR discount-rate beta ($\beta^{DR(VAR)}$) are estimated using cash-flow news and discount-rate news components from 1980 to 2011. d^{HEII} is the dummy variable for firms with high EII, which equals 1 if a firm has expected announcement in month t+1 and 0 otherwise. d^{LEII} is the dummy variable for firms with low EII, defined as 1-d^{HEII}. The table also reports regression results on lagged EA beta interacting with d^{HEII} and d^{LEII}, with VAR cash-flow beta ($\beta^{CF(VAR)}$) included as a control variable. Other control variables are the same as those in Table 5. The t-statistics are based on Newey-West standard errors with 12 lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
$\beta^{EA} * d^{HEII}$			0.179***	0.152***
			(4.27)	(3.59)
$\beta^{EA} * d^{LEII}$			0.003	0.012
			(0.15)	(0.54)
$\beta^{CF(VAR)}$			1.088*	0.652
			(1.65)	(1.49)
$\beta^{CF(VAR)} * d^{HEII}$	0.881	0.632		
	(1.41)	(1.49)		
$\beta^{CF(VAR)} * d^{LEII}$	1.215	0.682		
	(1.61)	(1.27)		
d^{HEII}	0.279***	0.364***	0.250***	0.334***
	(5.17)	(7.16)	(4.77)	(7.17)
$\beta^{DR(VAR)}$		-0.000		0.006
		(-0.00)		(0.04)
β^{CAPM}		0.120		0.111
		(0.46)		(0.43)
LNSIZE		-0.210**		-0.209**
		(-2.35)		(-2.34)
LNBM		0.235***		0.235***
		(4.36)		(4.36)
MOM		0.576**		0.572**
		(2.11)		(2.09)
IVOL		-0.160**		-0.159**
		(-2.35)		(-2.32)
ILLIQ		0.052***		0.052***
		(5.05)		(5.02)
LRET		-5.637***		-5.643***
		(-13.35)		(-13.36)
LEV		-0.575**		-0.587**
		(-2.12)		(-2.15)
IO		0.052		0.055
		(0.97)		(1.01)
COV		0.059**		0.059**
		(2.46)		(2.47)
SUE		0.251***		0.251***
		(8.73)		(8.73)
INTERCEPT	1.207***	1.142***	1.211***	1.155***
	(4.12)	(4.80)	(4.14)	(4.87)
N	1,192,922	1,192,922	1,192,922	1,192,922
Adj. R^2	0.007	0.066	0.007	0.066

Table 7. Quarterly Earnings Beta and Stock Returns

The table reports the results of Fama-MacBeth regressions of monthly stock returns in month t+1 on lagged quarterly earnings beta and other variables. Quarterly earnings beta (β^{QE}) is estimated using earnings growth rate. d^{HEII} is the dummy variable for firms with high EII, which equals 1 if a firm has expected announcement in month t+1 and 0 otherwise. d^{LEII} is the dummy variable for firms with low EII, defined as 1-d^{HEII}. The table also reports regression results on lagged EA beta interacting with d^{HEII} and d^{LEII}, with quarterly earnings beta (β^{QE}) included as a control variable. Other control variables are the same as those in Table 5. The t-statistics are based on Newey-West standard errors with 12 lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
$\beta^{EA} * d^{HEII}$			0.152***	0.128***
			(3.64)	(3.05)
$\beta^{EA} * d^{LEII}$			-0.009	-0.002
			(-0.48)	(-0.11)
β^{QE}			-0.002	-0.011
			(-0.36)	(-1.55)
$\beta^{QE} * d^{HEII}$	-0.007	-0.015		
	(-0.69)	(-1.50)		
$\beta^{QE} * d^{LEII}$	-0.001	-0.010		
	(-0.17)	(-1.41)		
d^{HEII}	0.249***	0.294***	0.239***	0.286***
	(5.25)	(6.85)	(5.01)	(6.51)
β^{CAPM}		0.073		0.069
		(0.32)		(0.30)
LNSIZE		-0.221***		-0.221***
		(-2.65)		(-2.65)
LNBM		0.167***		0.166***
		(3.07)		(3.05)
MOM		0.473**		0.472**
		(2.09)		(2.09)
IVOL		-0.144**		-0.143**
		(-2.33)		(-2.32)
ILLIQ		0.082***		0.082***
		(4.33)		(4.31)
LRET		-4.731***		-4.738***
		(-11.06)		(-11.10)
LEV		-0.568**		-0.570**
		(-2.40)		(-2.41)
IO		0.078		0.078
		(1.63)		(1.62)
COV		0.063*		0.064*
		(1.70)		(1.74)
SUE		0.164***		0.164***
		(4.65)		(4.54)
INTERCEPT	1.196***	1.152***	1.199***	1.158***
	(4.94)	(5.86)	(4.95)	(5.90)
N	1,534,461	1,534,461	1,534,461	1,534,461
Adj. R^2	0.003	0.063	0.003	0.063

Table 8. Earnings Announcement Beta and Announcement Returns

The table reports the results of monthly Fama-MacBeth regressions of announcement returns and non-announcement returns in month t+1 on lagged EA beta, VAR cash-flow beta and other control variables for announcing firms. The sample includes firms with earnings, distribution or M&A announcements in month t+1. Announcement return is defined as cumulative stock return over announcement window [-1,4], where 0 is the announcement date. Non-announcement return is defined as monthly return excluding announcement return. EA beta (β^{EA}) is estimated based on daily returns over the 3-year rolling window with at least 2 years of observations. VAR cash-flow beta ($\beta^{CF(VAR)}$) and VAR discount-rate beta ($\beta^{DR(VAR)}$) are estimated based on monthly returns over 3-year rolling window using VAR cash-flow news and discount-rate news components. Other control variables are the same as those in Table 5. The t-statistics are based on Newey-West standard errors with 12 lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Announcement Returns				*Non-announcement Returns*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β^{EA}	0.091***	0.082***	0.140***	0.123***	0.048*	0.028	0.042	0.023
	(2.84)	(2.65)	(4.55)	(4.06)	(1.77)	(1.12)	(1.42)	(0.84)
$\beta^{CF(VAR)}$			0.999**	0.747*			0.448	0.306
			(2.02)	(1.91)			(0.68)	(0.86)
$\beta^{DR(VAR)}$			-0.020	-0.035			-0.076	0.063
			(-0.12)	(-0.29)			(-0.34)	(0.47)
β^{CAPM}		-0.275***		-0.361***		0.292		0.385*
		(-2.82)		(-3.37)		(1.65)		(1.92)
LNSIZE		-0.229***		-0.215***		-0.147**		-0.121
		(-4.63)		(-3.79)		(-2.13)		(-1.61)
LNBM		0.139***		0.162***		0.027		0.086
		(3.74)		(3.97)		(0.47)		(1.44)
MOM		0.296***		0.338***		0.560***		0.645***
		(3.59)		(3.27)		(3.04)		(3.04)
IVOL		-0.259***		-0.286***		0.133*		0.123
		(-8.25)		(-8.63)		(1.76)		(1.49)
ILLIQ		0.108***		0.118***		-0.012		-0.001
		(4.29)		(4.81)		(-0.56)		(-0.06)
LRET		-1.158***		-1.371***		-4.909***		-5.809***
		(-4.19)		(-4.84)		(-11.37)		(-15.51)
LEV		-0.069		-0.099		-0.264		-0.249
		(-0.61)		(-0.89)		(-1.52)		(-1.30)
IO		0.220***		0.238***		-0.003		-0.016
		(5.16)		(5.20)		(-0.07)		(-0.33)
COV		0.117***		0.123***		-0.005		-0.005
		(4.49)		(4.03)		(-0.14)		(-0.15)
SUE		0.799		0.959		2.451***		2.468***
		(1.13)		(1.29)		(3.75)		(3.70)
INTERCEPT	0.516***	0.665***	0.565***	0.754***	1.249***	1.004***	1.179***	0.967***
	(6.61)	(7.46)	(6.78)	(7.98)	(6.50)	(5.83)	(5.35)	(4.44)
N	510,013	510,013	390,299	390,299	510,013	510,013	390,299	390,299
Adj. R^2	0.001	0.027	0.027	0.028	0.001	0.059	0.011	0.060

Table 9. Spillover Effect: Non-Announcing Connected Firms

The table reports the results of monthly Fama-MacBeth regressions of announcement returns of non-announcing connected firms in month t+1 on lagged EA beta and other control variables. Non-announcing connected firms are identified as firms in the same industry of announcing firms with similar size. Announcement return is defined as cumulative stock return of non-announcing connected firms over announcement window [-1,4] of announcing firms in columns (1) and (2) and over announcement window [0,5] of announcing firms in columns (3) and (4). Control variables are the same as those in Table 5. The t-statistics of regression estimates are based on Newey-West standard errors with 12 lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Announcement Window [-1,4]		Announcement Window [0,5]	
	(1)	(2)	(3)	(4)
β^{EA}	0.037**	0.037**	0.039**	0.040**
	(2.41)	(2.22)	(2.42)	(2.45)
β^{CAPM}		-0.018		-0.016
		(-0.22)		(-0.18)
LNSIZE		-0.010		0.003
		(-0.28)		(0.08)
LNBM		0.120***		0.125***
		(3.34)		(3.67)
MOM		0.101		0.110
		(1.09)		(1.25)
IVOL		-0.047		-0.058*
		(-1.39)		(-1.66)
ILLIQ		0.017		0.037
		(0.46)		(1.55)
LRET		-0.486*		-0.580**
		(-1.88)		(-2.53)
LEV		-0.439***		-0.400***
		(-4.31)		(-3.73)
IO		-0.031		-0.025
		(-1.03)		(-0.83)
COV		0.060**		0.058**
		(2.28)		(2.22)
SUE		1.041**		1.115**
		(2.28)		(2.58)
INTERCEPT	0.204***	0.346***	0.212***	0.345***
	(2.65)	(4.35)	(2.75)	(4.68)
N	378,201	378,201	378,201	378,201
Adj. R^2	0.001	0.028	0.001	0.029

Table 10. Effect of Investor Attention

The table reports the results of monthly Fama-MacBeth regressions of announcement returns in month t+1 on lagged EA beta interacting with investor attention dummies and other control variables. Announcement return is defined as cumulative stock return over announcement window [-1,4] where day 0 is the announcement date. The sample includes firms with earnings, distribution or M&A announcements in month t+1. In columns (1) and (2), high investor attention dummy (d^{HIA}) equals to 1 if a firm has log excess turnover higher than the cross-sectional median and 0 otherwise. In columns (3) and (4), high investor attention dummy (d^{HIA}) equals to 1 if a firm has log excess trading volume higher than the cross-sectional median and 0 otherwise. Low investor attention dummy is defined as d^{LIA}=1-d^{HIA}. Control variables are the same as those in Table 5. The t-statistics are based on Newey-West standard errors with 12 lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Excess Turnover		Excess Trading Volume	
	(1)	(2)	(3)	(4)
β^{EA}*d^{HIA}	0.135***	0.120**	0.131***	0.118**
	(2.65)	(2.44)	(2.74)	(2.58)
β^{EA}* d^{LIA}	0.030	0.031	0.032	0.036
	(1.46)	(1.40)	(1.29)	(1.48)
d^{HIA}	1.275***	1.157***	2.173***	2.073***
	(9.54)	(8.50)	(16.47)	(16.05)
β^{CAPM}		-0.383***		-0.442***
		(-4.09)		(-5.11)
LNSIZE		-0.145***		-0.099**
		(-3.07)		(-2.15)
LNBM		0.138***		0.153***
		(3.73)		(4.29)
MOM		0.274***		0.236***
		(3.35)		(3.07)
IVOL		-0.207***		-0.143***
		(-6.77)		(-4.78)
ILLIQ		0.101***		0.089***
		(4.09)		(3.61)
LRET		-1.188***		-1.765***
		(-4.28)		(-6.05)
LEV		0.010		0.051
		(0.09)		(0.45)
IO		0.191***		0.143***
		(4.60)		(3.63)
COV		0.111***		0.087***
		(4.18)		(3.15)
SUE		0.578		0.476
		(0.86)		(0.70)
INTERCEPT	-0.120*	0.166*	-0.570***	-0.213**
	(-1.94)	(1.93)	(-7.79)	(-2.32)
N	509,548	509,548	509,548	509,548
Adj. R^2	0.011	0.036	0.018	0.041

Table 11. Effect of Earnings Uncertainty

The table reports the results of monthly Fama-MacBeth regressions of announcement returns in month t+1 on lagged EA beta interacting with earnings uncertainty dummies and other control variables. Announcement return is defined as cumulative stock return over announcement window [-1,4] where day 0 is the announcement date. The sample includes firms with earnings, distribution or M&A announcements in month t+1. In columns (1) and (2), high earnings uncertainty dummy (d^{HEU}) equals 1 if a firm has standard deviation of earnings surprise higher than the cross-sectional median and 0 otherwise. Standardized earnings surprise is estimated from a seasonal random walk model and the standard deviation is calculated over the previous twelve quarters. In columns (3) and (4), high earnings uncertainty dummy (d^{HEU}) equals 1 if a firm has residual analyst coverage lower than the cross-sectional median and 0 otherwise. Low information uncertainty dummy is defined as d^{LEU}=1-d^{HEU}. Control variables are the same as those in Table 5. The t-statistics are based on Newey-West standard errors with 12 lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Earnings Surprise		Analyst Coverage	
	(1)	(2)	(3)	(4)
β^{EA}*d^{HEU}	0.121***	0.104**	0.130***	0.114***
	(2.78)	(2.47)	(3.50)	(3.15)
β^{EA}* d^{LEU}	0.059	0.074*	0.052	0.050
	(1.52)	(1.93)	(1.34)	(1.33)
d^{HEU}	-0.021	-0.106**	-0.004	0.021
	(-0.39)	(-2.42)	(-0.08)	(0.40)
β^{CAPM}		-0.234**		-0.267***
		(-2.23)		(-2.71)
LNSIZE		-0.245***		-0.237***
		(-4.86)		(-4.70)
LNBM		0.144***		0.142***
		(3.77)		(3.82)
MOM		0.271***		0.299***
		(3.16)		(3.67)
IVOL		-0.256***		-0.262***
		(-7.27)		(-8.19)
ILLIQ		0.110***		0.111***
		(4.26)		(4.35)
LRET		-1.214***		-1.179***
		(-4.62)		(-4.27)
LEV		0.028		-0.068
		(0.25)		(-0.61)
IO		0.226***		0.222***
		(5.25)		(5.31)
COV		0.111***		0.125***
		(4.23)		(4.31)
SUE		0.850		0.778
		(1.27)		(1.10)
INTERCEPT	0.532***	0.637***	0.517***	0.648***
	(8.41)	(6.82)	(6.36)	(6.67)
N	491,667	491,667	510,013	510,013
Adj. R^2	0.003	0.027	0.003	0.027

Appendix A.

Table A1. Returns of Portfolios sorted on Earnings Announcement Beta: Results based on Actual Announcements

Each month, stocks are first divided into those with earnings or distribution announcements and those without in month t+1. Within each subsample, stocks are then sorted into quintile portfolios based on EA beta estimated in month t. Quintile Q1 (5) consists of stocks with the lowest (highest) EA betas. Panel A reports average returns and Fama-French three- and five-factor alphas in month t+1 for quintile portfolios. The panel also reports return and alpha spreads between the top and bottom quintiles. Panel B reports average returns and alphas for firms with and without announcements in month t+1 as well as their differences. Panel C reports return spreads between top EA beta quintile portfolio of announcing firms in month t+1 and portfolio of non-announcing firms in month t+1. In Panel D, stocks are first sorted into quintile portfolios based on EA beta estimated in month t. For each quintile, the panel reports differences in average returns and alphas between announcing firms and non-announcing in month t+1. N is the average number of firms in each quintile. The t-statistics are based on Newey-West standard errors with three lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Returns of Portfolios sorted on EA Beta

β^{EA} Quintile	N	Equal-weighted Return			Value-weighted Return		
		Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
				Firms with Announcements			
Q1	214	1.53	0.31	0.41	1.44	0.34	0.42
Q2	214	1.52	0.41	0.38	1.42	0.38	0.30
Q3	214	1.62	0.54	0.51	1.54	0.51	0.44
Q4	214	1.66	0.52	0.47	1.36	0.32	0.28
Q5	214	1.86	0.64	0.73	1.84	0.72	0.91
Q5-Q1		0.34***	0.33***	0.32***	0.40**	0.38**	0.49**
(t-Stat)		(3.34)	(3.31)	(2.97)	(2.10)	(1.97)	(2.35)
				Firms without Announcements			
Q1	447	1.18	-0.05	0.09	0.92	-0.25	-0.18
Q2	448	1.03	-0.10	-0.11	0.96	-0.10	-0.16
Q3	448	1.07	-0.03	-0.06	0.90	-0.14	-0.22
Q4	448	1.09	-0.04	-0.04	0.77	-0.27	-0.34
Q5	447	1.16	-0.08	0.05	0.97	-0.17	-0.03
Q5-Q1		-0.02	-0.03	-0.03	0.05	0.08	0.15
(t-Stat)		(-0.33)	(-0.52)	(-0.58)	(0.45)	(0.77)	(1.43)

Panel B: Announcement Premium – Average Returns of Announcing and Non-announcing Firms

	N	Equal-weighted Return			Value-weighted Return		
		Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
Announcing Firms	1,071	1.64	0.48	0.50	1.48	0.43	0.42
Non-announcing Firms	2,238	1.11	-0.06	-0.01	0.89	-0.18	-0.20
Diff		0.53***	0.54***	0.52***	0.59***	0.61***	0.62***
(t-Stat)		(7.55)	(7.20)	(6.54)	(7.36)	(7.41)	(7.34)

Panel C: Enhanced Strategy based on Announcing Firms in the Top β^{EA} Quintile and Non-announcing Firms

	N	Equal-weighted Return			Value-weighted Return		
		Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
Top β^{EA} Quintile Announcing Firms	214	1.86	0.64	0.73	1.84	0.72	0.91
Non-announcing Firms	2,238	1.11	-0.06	-0.01	0.89	-0.18	-0.20
Diff		0.76***	0.70***	0.75***	0.96***	0.90***	1.11***
(t-Stat)		(7.16)	(6.96)	(7.04)	(5.07)	(4.88)	(5.17)

Panel D: Announcement Premium across EA Beta Quintiles

β^{EA} Quintile	Number of Announcing Firms	Number of Non-announcing Firms	Equal-weighted Return			Value-weighted Return		
			Return	FF3 Alpha	FF5 Alpha	Return	FF3 Alpha	FF5 Alpha
Q1	209	452	0.40***	0.41***	0.37***	0.57***	0.65***	0.69***
			(3.67)	(3.72)	(3.16)	(4.19)	(4.42)	(4.47)
Q2	217	445	0.47***	0.48***	0.48***	0.55***	0.57***	0.52***
			(5.35)	(5.28)	(5.23)	(4.47)	(4.60)	(3.72)
Q3	217	445	0.57***	0.58***	0.58***	0.63***	0.63***	0.64***
			(6.84)	(6.54)	(6.41)	(6.12)	(5.69)	(6.11)
Q4	217	445	0.62***	0.62***	0.58***	0.62***	0.62***	0.65***
			(7.04)	(6.84)	(6.20)	(4.25)	(4.14)	(4.64)
Q5	210	451	0.72***	0.72***	0.68***	0.87***	0.88***	0.90***
			(8.16)	(7.73)	(6.94)	(4.92)	(4.86)	(4.35)
Q5-Q1			0.32***	0.31***	0.30**	0.30	0.22	0.21
(t-Stat)			(2.81)	(2.77)	(2.56)	(1.44)	(1.02)	(0.88)
			Average Announcement Premium across EA Beta Quintiles					
	Average		0.56***	0.56***	0.54***	0.65***	0.67***	0.68***
	(t-Stat)		(8.19)	(7.78)	(7.24)	(8.84)	(8.77)	(8.14)

Table A2. Dimson (1979) Earnings Announcement Beta and Stock Returns

The table reports the results of regressions of monthly stock returns in month t+1 on lagged Dimson (1979) EA beta interacting with high and low expected information intensity (EII) dummy variables, and other control variables. Columns (1) and (2) report the results of Fama-MacBeth cross-sectional regressions. Columns (3) and (4) report the results of panel regressions with time fixed effects. Dimson (1979) EA beta ($\beta^{EA(D)}$) is estimated based on daily returns, with one lead and one lag of market returns, over the 3-year rolling window with at least 2 years of observations. d^{HEII} is the dummy variable for firms with high EII, which equals 1 if a firm has expected announcement in month t+1 and 0 otherwise. d^{LEII} is the dummy variable for firms with low EII, defined as 1-d^{HEII}. Control variables are the same as those in Table 5. For Fama-MacBeth regressions, the t-statistics are based on Newey-West standard errors with 12 lags. For panel regressions, the t-statistics are based on standard errors clustered by time. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Fama-MacBeth Regression		Panel Regression	
	(1)	(2)	(3)	(4)
$\beta^{EA(D)}*d^{HEII}$	0.060***	0.044**	0.042**	0.041**
	(2.80)	(2.13)	(2.43)	(2.34)
$\beta^{EA(D)}*d^{LEII}$	0.011	0.014	0.010	0.010
	(0.75)	(1.12)	(0.82)	(0.83)
d^{HEII}	0.235***	0.284***	0.172**	0.174**
	(4.95)	(6.49)	(2.23)	(2.42)
β^{CAPM}		0.073		0.055
		(0.32)		(0.20)
LNSIZE		-0.224***		-0.228***
		(-2.67)		(-3.19)
LNBM		0.158***		0.227***
		(2.91)		(3.20)
MOM		0.503**		0.410
		(2.30)		(1.33)
IVOL		-0.148**		-0.077
		(-2.41)		(-0.77)
ILLIQ		0.083***		0.021***
		(4.36)		(3.33)
LRET		-4.733***		-4.065***
		(-11.04)		(-3.83)
LEV		-0.566**		-0.477**
		(-2.40)		(-2.01)
IO		0.075		0.066
		(1.56)		(1.10)
COV		0.066*		0.087**
		(1.78)		(2.15)
SUE		0.193***		0.192***
		(6.17)		(4.60)
INTERCEPT	1.199***	1.137***	1.179***	1.350***
	(4.84)	(5.72)	(4.73)	(6.18)
N	1,545,021	1,545,021	1,545,021	1,545,021
Adj. R^2	0.002	0.062	0.126	0.128

Table A3. Earnings Announcement Beta and Stock Returns: Multivariate Regressions based on Actual Corporate Announcements

The table reports the results of regressions of monthly stock returns in month t+1 on lagged EA beta interacting with high and low realized information intensity (RII) dummy variables, and other control variables. Columns (1) and (2) report the results of Fama-MacBeth cross-sectional regressions. Columns (3) and (4) report the results of panel regressions with time-fixed effects. EA beta (β^{EA}) is estimated based on daily returns over the 3-year rolling window with at least 2 years of observations. d^{HRII} is the dummy variable for high realized information intensity (RII). d^{HRII} equals 1 if a firm has announcement in month t+1 and 0 otherwise. d^{LRII} is the dummy variable for low RII. d^{LRII} is defined as 1-d^{HRII}. The results in Panel A are based on earnings and distribution announcements. The results in Panel B are based on distribution and M&A announcements. Control variables are the same as those in Table 5. For Fama-MacBeth regressions, the t-statistics are based on Newey-West standard errors with 12 lags. For panel regressions, the t-statistics are based on standard errors clustered by time. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Results based on Earnings and Distribution Announcements

	Fama-MacBeth Regression		Panel Regression	
	(1)	(2)	(3)	(4)
$\beta^{EA}*d^{HRII}$	0.156***	0.134***	0.104***	0.100***
	(3.66)	(3.31)	(3.47)	(3.30)
$\beta^{EA}*d^{LRII}$	-0.006	-0.000	-0.003	-0.002
	(-0.30)	(-0.01)	(-0.13)	(-0.12)
d^{HRII}	0.531***	0.589***	0.429***	0.428***
	(8.89)	(9.77)	(5.24)	(5.52)
β^{CAPM}		0.070		0.051
		(0.30)		(0.18)
LNSIZE		-0.236***		-0.231***
		(-2.82)		(-3.23)
LNBM		0.159***		0.228***
		(2.91)		(3.21)
MOM		0.494**		0.408
		(2.26)		(1.32)
IVOL		-0.138**		-0.067
		(-2.22)		(-0.67)
ILLIQ		0.083***		0.021***
		(4.33)		(3.32)
LRET		-4.739***		-4.058***
		(-11.12)		(-3.82)
LEV		-0.571**		-0.474**
		(-2.40)		(-2.00)
IO		0.072		0.066
		(1.49)		(1.10)
COV		0.067*		0.096**
		(1.81)		(2.36)
SUE		0.193***		0.192***
		(6.16)		(4.60)
INTERCEPT	1.106***	1.038***	1.096***	1.272***
	(4.52)	(5.26)	(4.14)	(5.78)
N	1,545,021	1,545,021	1,545,021	1,545,021
Adj. R^2	0.002	0.063	0.127	0.128

Panel B: Results based on Distribution and M&A Announcements

	Fama-MacBeth Regression		Panel Regression	
	(1)	(2)	(3)	(4)
$\beta^{EA}*d^{HRII}$	0.189*	0.221**	0.214**	0.208**
	(1.66)	(2.08)	(2.54)	(2.48)
$\beta^{EA}*d^{LRII}$	0.021	0.020	0.026	0.024
	(1.13)	(1.21)	(1.52)	(1.37)
d^{HRII}	1.964***	2.008***	1.928***	2.010***
	(17.18)	(18.78)	(20.32)	(28.55)
β^{CAPM}		0.090		0.071
		(0.39)		(0.26)
LNSIZE		-0.243***		-0.252***
		(-2.89)		(-3.53)
LNBM		0.172***		0.235***
		(3.11)		(3.30)
MOM		0.462**		0.384
		(2.12)		(1.24)
IVOL		-0.140**		-0.066
		(-2.28)		(-0.65)
ILLIQ		0.083***		0.020***
		(4.29)		(3.25)
LRET		-4.741***		-4.087***
		(-10.99)		(-3.85)
LEV		-0.568**		-0.483**
		(-2.40)		(-2.04)
IO		0.079		0.069
		(1.64)		(1.15)
COV		0.064*		0.083**
		(1.74)		(2.07)
SUE		0.194***		0.191***
		(6.14)		(4.59)
INTERCEPT	1.193***	1.145***	1.167***	1.333***
	(4.84)	(5.84)	(3.40)	(6.11)
N	1,545,021	1,545,021	1,545,021	1,545,021
Adj. R^2	0.001	0.063	0.127	0.129

Appendix B

Table B1. Earnings Announcement Beta and Announcement Returns: Results based on Distribution and M&A Announcements

The table reports the results of monthly Fama-MacBeth regressions of announcement returns in month t+1 on lagged EA beta, VAR cash-flow beta and other control variables for announcing firms. The sample includes firms with distribution or M&A announcements in month t+1. Announcement return is defined as cumulative stock return over announcement window [-1,4], where 0 is the announcement date. EA beta (β^{EA}) is estimated based on daily returns over the 3-year rolling window with at least 2 years of observations. VAR cash-flow beta ($\beta^{CF(VAR)}$) and VAR discount-rate beta ($\beta^{DR(VAR)}$) are estimated based on monthly returns over 3-year rolling window using VAR cash-flow news and discount-rate news components. Other control variables are the same as those in Table 5. The t-statistics are based on Newey-West standard errors with 12 lags. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
β^{EA}	0.148*	0.116*	0.178*	0.165**
	(1.82)	(1.81)	(1.90)	(2.16)
$\beta^{CF(VAR)}$			2.098***	1.275**
			(3.37)	(2.07)
$\beta^{DR(VAR)}$			0.049	0.155
			(0.15)	(0.57)
β^{CAPM}		-0.200		-0.297*
		(-1.31)		(-1.72)
LNSIZE		-0.570***		-0.602***
		(-7.45)		(-7.17)
LNBM		-0.112		-0.030
		(-1.35)		(-0.31)
MOM		0.507***		0.796***
		(3.18)		(4.64)
IVOL		0.386***		0.321**
		(3.57)		(2.35)
ILLIQ		-0.081		0.272***
		(-0.23)		(2.95)
LRET		-1.949***		-1.975***
		(-2.65)		(-3.15)
LEV		-0.098		-0.063
		(-0.38)		(-0.25)
IO		-0.141**		-0.151**
		(-2.43)		(-2.24)
COV		-0.034		0.006
		(-0.82)		(0.12)
SUE		5.759**		6.190**
		(2.33)		(2.14)
INTERCEPT	1.491***	1.786***	1.456***	1.839***
	(15.15)	(10.35)	(14.19)	(9.33)
N	53,673	53,673	41,339	41,339
Adj. R^2	0.008	0.097	0.023	0.106